

modern machine shop

GET THE FACTS
BEFORE YOU
HEAT TREAT

See Page 106

MACHINING TO
MILLIONTHS IS
EASY

See Page 116

JUNE 1952

specializing only in drill jig bushings

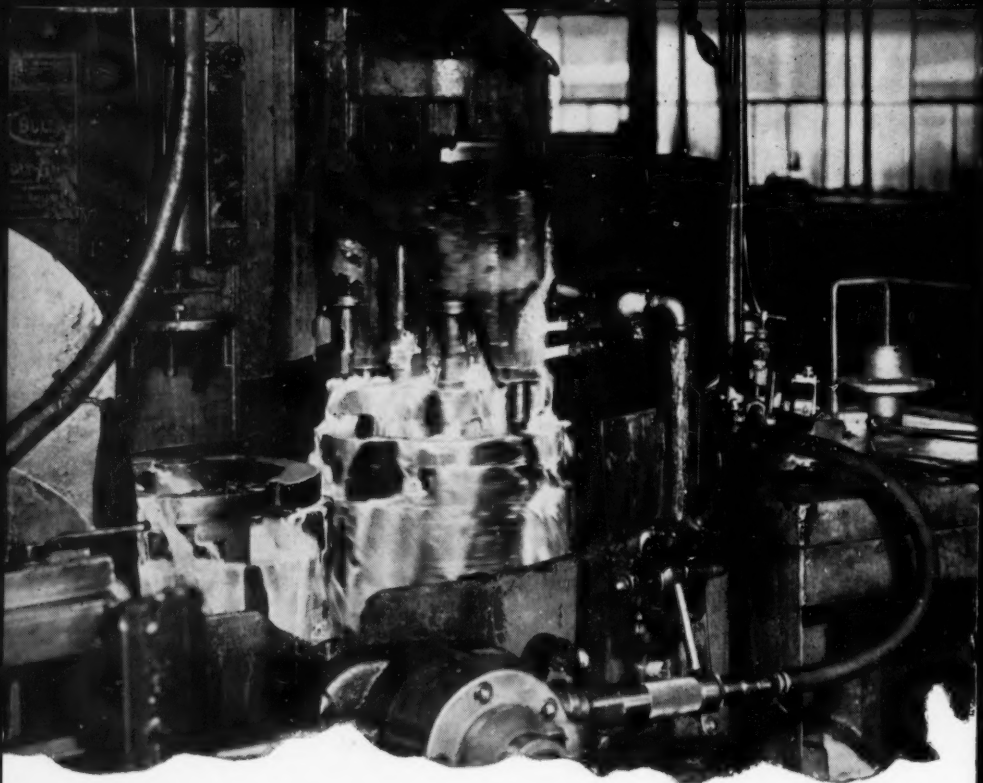


American

DRILL BUSHING CO.

5107 Pacific Blvd. • Los Angeles 58, Calif.

SEND FOR FREE COPIES OF OUR NEW CATALOG



Don't let RUST eat away your profits

Rust in a valuable machine tool or on finished parts can sometimes cost you thousands of dollars—and it's often difficult to prevent. But it *can* be prevented. Proved in the field and constantly improved for more than 30 years, Texaco Soluble Oils have shown that they give full protection against rust.

In addition, Texaco Soluble Oils have cooling and other properties—assuring longer tool life. They keep machines cleaner, emulsify readily with water, remain stable, and assure freedom from odor problems.

Your local Texaco lubrication representative will be glad to help you select the proper coolant from a full line of Texaco Cutting, Grinding and Souble

Oils. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

For more data circle 302 on Postpaid Card

M. L.
RICH
FRED
ROBE
LOUI
M. C.
GILB
ALFR
NORM
HOW

FEA

DEP

IMPO
FREE
ADVE
OVER
PROD

Publis
Printed

modern machine shop

Published in the
Machine Tool Capital
of the World

M. L. FORNEY, *Publisher*
RICHARD S. KLINE, *General Manager*
FRED W. VOGEL, *Editor*
ROBERT I. SHORE, *Managing Editor*
LOUIS H. DOERMAN, *Assistant Editor*
M. C. DUE, *Editorial Assistant*
GILBERT C. CLOSE, *Field Editor*
ALFRED M. COOPER, *Contributing Editor*
NORMAN S. ROGERS, *Art Editor*
HOWARD CAMPBELL, *Editor Emeritus*

FEATURES IN THIS ISSUE

Vol. 31, No. 1, June, 1958

Machining	"PACKAGED PRECISION" SPEEDS VALVE PRODUCTION.....	102
	By Louis H. Doerman	
Heat Treating	HEAT TREATING—SHOULD YOU DO IT YOURSELF?.....	106
	By A. S. Eves	
Grinding	PRODUCTION GRINDING PARTS TO MILLIONTHS.....	116
	By Bartlett West	
Lubricants	HOW TO SET UP AN EFFICIENT LUBRICATION SYSTEM.....	120
	By F. A. Kellner	
Management	DISTRIBUTORS TAKE A PUNCH AT SERVICE PROBLEMS.....	125
	By Samuel H. Clark	
Employee Training	NEW FACTORS IN MORALE DEVELOPMENT.....	128
	By Alfred M. Cooper	
Welding	AUTOMATIC WELDING SIMPLIFIES CYLINDER FABRICATION..	148
	By E. E. Martinac	
High Speed Tooling	TOOL CHANGE REDUCES CORE DRILLING COSTS.....	150
Milling	ELECTRO-HYDRAULIC DRIVE INCREASES MILLING SPEED.....	152
Metal Chilling	LOW TEMPERATURE CYCLING OF GUIDANCE COMPONENTS..	154
Boring	STEEL FORGING BORED 8 TIMES FASTER.....	156
Tool Design	COMBINATION ROUGHING AND FINISHING BORING BAR...	160
	By Harold Sedlik	
Fastening	UNUSUAL WORK-CLAMPING METHOD	160
	By Federico Strasser	
Jigs	SIMPLE EXPANDING MANDREL FOR MACHINE TOOLS.....	161
	By R. B. Courtney	
Drilling	UNIQUE METHOD FOR DRILLING ROUND STOCK.....	162
	By H. J. Gerber	

DEPARTMENTS

IMPORTANT MEETING DATES.....	48	IDEAS FROM READERS....	160
FREE LITERATURE	70	NEWS OF THE INDUSTRY..	166
ADVERTISING REPRESENTATIVES	93	NEW SHOP EQUIPMENT...	180
OVER THE EDITOR'S DESK.....	94	WHERE TO GET IT.....	278
PRODUCTION THRU MODERNIZATION	148	INDEX TO ADVERTISEMENTS	286



Member



features in the

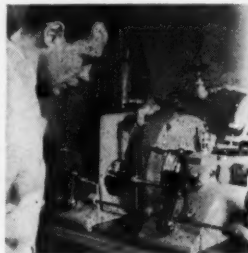
Assembling & Finishing...Inspecting, Testing & Control...
Press Working...Management & Safe Practices...Material
& Processes...Production Machining...Tooling & Design

JUNE

"PACKAGED PRECISION" ACCELERATES SERVO VALVE PRODUCTION

By Louis H. Doerman

Judicious selection and arrangement of standard machine tools and gages provides for the precise manufacture of parts for valves used in servomechanisms. Interesting illustrations included with the presentation trace the various valve parts through plunge-grinding, finish grinding, o.d. gaging, hardness testing, electro-discharge machining, ultrasonic machining, inspection and match grinding operations.



Page 102

HEAT TREATING— SHOULD YOU DO IT YOURSELF?

By A. S. Eves

It is interesting how widely different are the opinions on the above question, for no apparent reason. In this article, several important factors which manufacturers should consider in deciding whether to do their own heat treating or sub-contract it are clearly discussed.

Page 106

PRODUCTION GRINDING PARTS TO MILLIONTHS

By Bartlett West

Herein described is an important new development by Brown and Sharpe Manufacturing Company which enables semi-skilled operators to grind parts to extremely close tolerances on a production basis.

Page 116

H

LU

By

In

wh

pl

lu

fic

th

ma

Pa

DI

AT

By

Se

inc

an

au

an

as

tri

Pa

NE

By

"T

tain

diff

fac

the

ear

two

say

tim

fail

Pa

in this issue

JUNE 1958 • VOL. 31 • NO. 1

HOW TO SET UP AN EFFICIENT LUBRICATION SYSTEM

By F. A. Kellner

In spite of the bewildering variety of lubricants which are now available, the setting up of a well-planned system of checking, adding and changing lubricants to conform to the manufacturer's specifications is neither expensive nor difficult. It more than repays its cost in reduced down time and lower maintenance.

Page 120

DISTRIBUTORS TAKE A PUNCH AT SERVICE PROBLEMS

By Samuel H. Clark

Self analysis through studies, surveys and research indicate where distributors can be of greater assistance to manufacturer and customer. Mr. Clark, the author of this article, is president of Samuel Harris and Company, Chicago, Illinois, industrial supplier, as well as president of the National Industrial Distributors' Association.

Page 125

NEW FACTORS IN MORALE DEVELOPMENT

By Alfred M. Cooper

"Today's problem of maintaining high worker morale differs sharply from that facing the supervisor during the hectic war years or the earlier formative years between 1900 and 1941," so says author Cooper in this timely presentation. Don't fail to read it.

Page 128



modern machine shop



new LANDIS thread rolling heads

LANDIS Research has now developed the LANDIS Thread Rolling Head, exclusively featuring *replaceable helix angle bushings*—allowing rolling threads with exact helix angles without purchasing major head components.

The helix angle established for the standard bushing set is a “mean” angle suitable for rolling all diameters and pitches within the respective UNF and UNC ranges of the Heads. However, when the exact helix angle is required, the inexpensive helix angle bushings can be substituted for the standard bushings.

LANDIS Thread Rolling Heads will produce Class 4 threads of

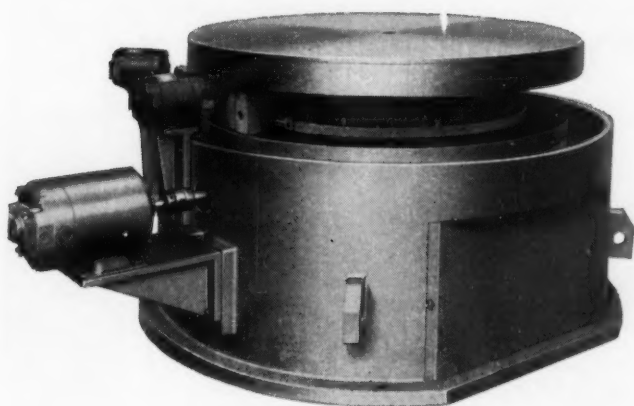
excellent finish at the high speeds used for carbide tooling without impairing roll life. These Heads can be operated indefinitely without adjustment as thread rolls never require regrinding. The rolls are designed in a manner which allows them to be reversed and both ends used. Self-opening Rotary and Stationary styles are now available for use on a variety of machines. The range is 5/16”-5/8” UNF and UNC—with larger models also available in the near future. For complete information request Bulletin F-99.

522

LANDIS Machine COMPANY

WAYNESBORO
PENNSYLVANIA

For more data circle 305 on Postpaid Card



drill varied hole patterns without changing set-up

If your drilling, tapping, or milling jobs require even, uneven, or skip indexing, this new ElectroDEX table will give you more flexibility than ever.

Set up your work piece just once on this table, and you can drill many different hole patterns. Changeover from one index pattern to another is fast. You can do it mechanically—with index rings or inexpensive templates—

or by push-button electrical counting.

Eight-channel numerical tape control is available. You get indexing accuracy to $\pm .001$ " at a 45" diameter. And you can choose your table size from 30", 45", 60", and 80" diameters.

Bulletin 258 gives complete details.

Avey Division, The Motch & Merryweather Machinery Co., Box No. 625, Cincinnati 1, Ohio.



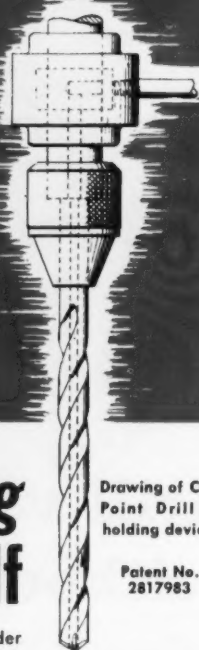
For more data circle 306 on Postpaid Card

June, 1958

modern machine shop 5

It's mainly a matter of **TIMING!**

Amazing new development in drilling



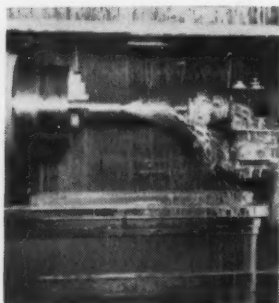
Drawing of Cold Point Drill in holding device.

Patent No.
2817983

Cold Point Drilling **Cuts Drilling Time in Half**

Large hollow core provides passage for **large** volume of coolant under pressure to face of tip thus reducing the amount of heat generated.

Mossberg Cold Point Drills, Carbide Tipped, are available in sizes from $\frac{1}{16}$ " to $\frac{3}{4}$ " taper lengths. Straight shank taper lengths are standard. The approximate average price of a drill in dozen lots is \$15.00 each.



Cold Point Drill in action. Note large volume of coolant being forced from hole.

You can use your present drill press equipment by adding a transfer unit without collets at a cost of \$230.00. Likewise, you can use your present turret and engine lathe equipment by attaching a Jacobs Rubber Flex chuck with coolant arbor without collets for \$180.00.

You choose your own coolant-pump and coolant. We recommend 100 to 125 p.s.i. and any good water-soluble oil.

Send us a sample of the metal you want to drill (rounds $\frac{1}{2}$ " to 2", if possible). We will work out feeds and speeds. Tests are being run every day. If you wish, write or phone for an appointment and help us in the evaluation. Bring or send any type of metal.

MOSSBERG, INC., 7824 Hamilton Ave.
Cincinnati 31, Ohio

For more data circle 307 on Postpaid Card

It's mainly a matter of **TIMING!**

But WHEN to replace a machine depends on more than its age



YEARS ALONE don't tell you when a machine has reached retirement age. In fact the age of a machine may be a relatively minor factor in computing the time at which it should be replaced. Some old machines may still have many years of economically productive life. While more recent ones, of a different type, may have already outlived their profitability in your plant.

It depends on many variable factors—including the comparative efficiency of the proposed new machine, and any design improvements which will become available in the foreseeable future. But whatever the replacement conditions, proper timing can

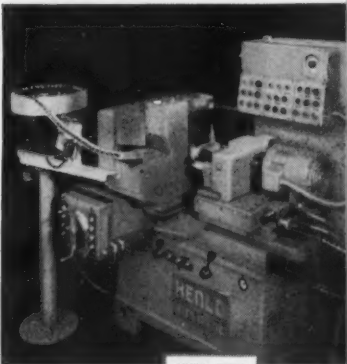
mean the difference between profit and loss. Too early is just as bad as too late. But there is one mathematically predictable time when replacement will cost you the least amount of money. This replacement minimum can't be determined by guesswork, intuition, or rule-of-thumb. It requires precise methods of replacement analysis, based on proved economic principles.

Our sales engineers are well experienced in making such obsolescence studies. And they will be glad to do the same for you. Similar studies by Heald engineers have pointed the way to many important savings.

For Example: A manufacturer of automotive parts was using two ten-year-old Heald Model 81 Centerless Internals for grinding a blind hole in steel bushings. A cost analysis showed that two new Heald Model 180 Centerless Internals, like that shown at the right, could do the same job at a saving of more than 66% in total operating cost. The replacement of the two old machines with two new ones resulted in the production and cost savings shown below.

2 Old Machines 2 New Machines

Parts per hour	276	426
Parts per year (Req'd. Prod.)	352,000	552,000
Direct Labor, per year	\$ 7,252	\$ 3,746
Scrap Losses, per year	\$ 4,182	\$ 705
Annual Maintenance	\$ 2,752	\$ 250
Annual Operating Cost	\$14,186	\$ 4,701
Annual Saving for New Machines		\$9,485



YOU pay for obsolescence. Replacement pays for itself!

THE HEALD MACHINE COMPANY

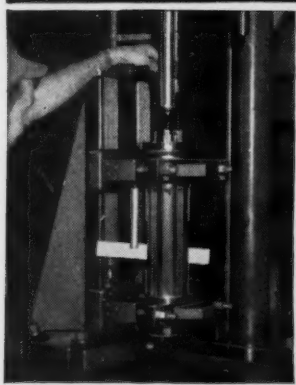
Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York



For more data circle 308 on Postpaid Card



WHY PAY TWICE AS MUCH?

Fulmer guarantees-

★ PRODUCTION
★ ACCURACY ★ VERSATILITY ★ EASE OF OPERATION

equal to or exceeding any other honing machine
at HALF the COST or LESS!

A tremendous, unnecessary structure of cast iron may look impressive but it only adds weight, bulk and cost. Fulmer Honing Machines are precision-engineered and production-proved for maximum output and accuracy at lowest cost.

They are deliberately over-engineered at vital points... bearings and gears, for example... but streamlined where bulk is not needed. Fulmer Honing Machines cost as little as half the price of "competitive" machines, yet equal or exceed them in rate of stock removal, accuracy of production, ease of operation and set-up.

Write today for complete new literature. We'll include FREE a Fulmer Honing Computer that shows you how much time and money you can save replacing conventional bore finishing methods.

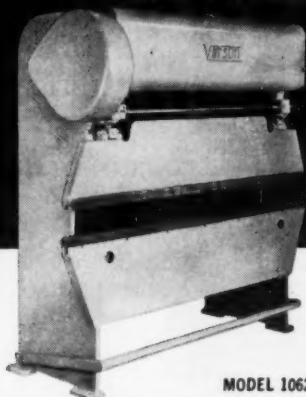
C. Allen Fulmer Co. • Dept. S • 107 E. Fourth St. • Cincinnati 2, Ohio

THE WORLD'S BEST
FULMER honing equipment

For more data circle 309 on Postpaid Card

TWO MODELS—NO WAITING

These Verson Power Press Brakes
are furnished from stock



MODEL 1062

\$2630*

is the full price of this Verson quality press brake, designed and built for top performance. 16 ga. x 78" capacity.



MODEL 16-48

\$1600*

will put this power press brake to work in your shop in a matter of days. Capacity is 16 ga. x 48" of mild steel.

Large shop . . . small shop . . . here are economical answers to a wide variety of bending jobs in any shop. Models 1062 and 16-48 are standard Verson Press Brakes available from stock without the annoyance of involved proposals or long delays in delivery.

Here's the chance to put famous Verson all steel construction and proved-in-service Verson design to work for you . . . at a price so attractive, it's hard to believe. Write for complete specifications or if you prefer . . . place your order NOW!

*Prices F.O.B. Chicago, less dies; subject to change without notice.

A Verson Press for every job from 60 tons up.

164



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Avenue, Chicago 19, Illinois

8300 S. Central Expressway, Dallas, Texas

For more data circle 310 on Postpaid Card



New CINCINNATI No. 1D Toolmaster Milling Machine. Catalog No. M-2017. Other styles: 1A, 1B and 1C; catalog No. M-1870-4.



CINCINNATI®

MILLING MACHINES • BROACHING MACHINES • CUTTER
METAL FORMING MACHINES • HARDENING MACHINES •

meet

1
C

A new
to a f
mach
memb
and c

Inf
100

Inst

thro

spin

1 1/2

usa

No.

...

and

Pov

dov

out

These
ages
perfor
of ver
ions,
boring
Compl
ogs. M

AND TO
CUTTING

et 1-D..newest member of the

CINCINNATI TOOLMASTER Family

A new member, No. 1-D, has been added to a fine family of tool and die milling machines . . . TOOLMASTER. The new member has many distinctive features and advantages:

Infinitely variable spindle speeds, 100-3800 rpm

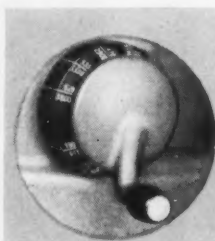
Instant selection of spindle speeds . . . through a control lever on front of the spindle head

1½ hp spindle drive . . . and it's all usable

No. 40 standard taper hole in spindle . . . and positive key drive for arbors and collets

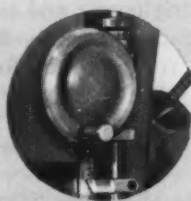
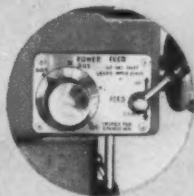
Power quill feed (extra) . . . up and down; three feed rates; power trip-out

These and other features and advantages give 1D Toolmasters the highest performance rating for reducing the cost of vertical and angular milling operations, and with additional equipment, boring and shaping operations as well. Complete information in attractive catalogs. May we send copies to you?



Spindle speeds are changed instantly. Merely select the high or low range and then rotate this control lever to the speed desired. Speeds are dial indicated.

For boring and drilling operations, you'll want power feed to quill, at slight extra cost. Three feed rates; knob selected; up and down; .0015", .003" and .006" per rev.



Quill feed hand-wheel, mounted on front of the spindle head, advances the quill in fine feed progression. A lever on the right-hand side quickly advances or retracts the quill.

CUTTER
NES •

AND TOOL GRINDERS • SPECIAL MACHINE TOOLS
CUTTING FLUIDS • GRINDING WHEELS

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

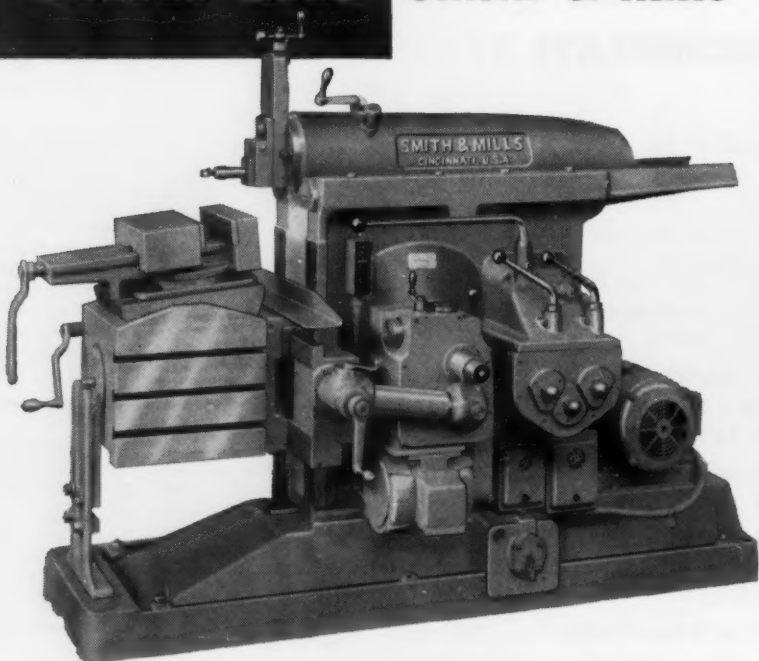
For more data circle 312 on Postpaid Card

June, 1958

modern machine shop 11

SHAPERS

Smith & Mills



Compare Smith & Mills with any other shaper for versatility, speed, cutting power and precision performance. Compare and you'll buy Smith & Mills—famous for high quality shapers since 1888. Write or wire for prices, deliveries, repair parts or field service. Smith & Mills Shaper Division, Nebel Machine Tool Corp., 3409-B Central Parkway, Cincinnati 25, Ohio.

Smith & Mills Shapers now available in Heavy Duty Models in 16", 20", 25", 28", 32" and 36" strokes, and Standard Duty Models in 20" and 24" strokes.

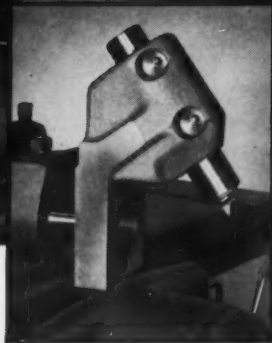
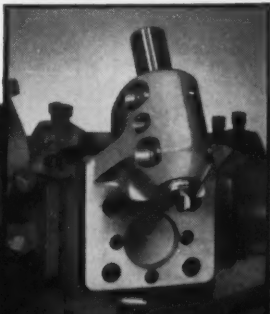


For more data circle 313 on Postpaid Card

**new microbore
turning heads
feature speed, ruggedness,
precision!**

Flange Mounting Heads mount directly on the face of the turret providing extreme rigidity.

Plate Mounting Heads, with a full range of straight shanks, mount on any turret plate for multi-diameter operations.



STANDARD, GENERAL PURPOSE FOR ALL HORIZONTAL TURRET LATHES!

Rugged, rigid and adjustable in seconds, these new general purpose turning heads perform a variety of single and multi-diameter operations repetitively with unfailing accuracy. Microbore's exclusive micrometer vernier adjustment provides a fast, accurate means of setting the tool point over a wide working range. 0" to 4" for *Shank or Flange Mounting Heads*. 0" to machine capacity for *Plate Mounting Heads*. Extreme rigidity throughout permits heavy stock removal while holding to closest tolerances. This combination of speed, ruggedness and precision reduces downtime, increases accuracy of the end product. Write for complete information.

Shank Mounting Heads permit quick, easy mounting in the turret and maximum versatility.

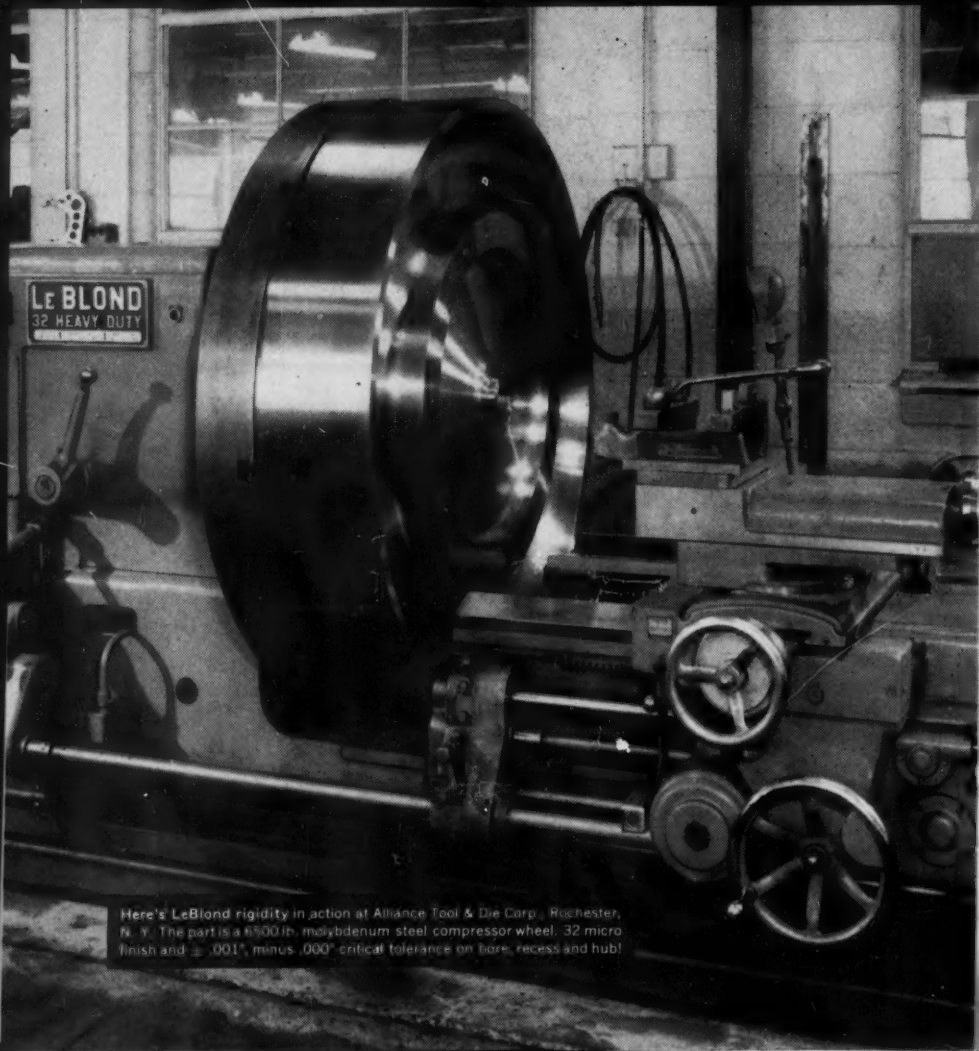
DeVLIEG  MICROBORE® SYSTEM

DE Vlieg MICROBORE • DIVISION OF DEVLIEG MACHINE COMPANY

2720 West Fourteen Mile Rd., Royal Oak, Michigan

For more data circle 314 on Postpaid Card

What is the **BIGGEST**



Here's LeBlond rigidity in action at Alliance Tool & Die Corp., Rochester, N. Y. The part is a 6500-lb. molybdenum steel compressor wheel, 32 micro finish and $\pm .001$ ", minus .000" critical tolerance on bore, recess and hub!

W

Prob
what
along
it. A
for a

Tod
odd-

Our
to 60
an ex
bed).
have
is 50
you
varie

3 lat

Here
Allia
speci
mold
How
too b
by M
take
ular

If yo
busin
it giv
turnin
availa
(show
sure
buy L
Call y

TH

workpiece your lathes can turn?

Probably your lathes will swing a 32" piece. Or 40". But what happens when that occasional 50" or 60" job comes along? Chances are you have to say, "We can't handle it. After all, how can you justify a big swing lathe, just for a few big jobs a year?"

Today there is a practical and economical solution to this odd-size work problem. LeBlond Sliding Bed Gap Lathes.

Our 32"/60" Heavy Duty will accommodate work up to 60" diameter! Basically this is a 32" lathe. But it has an extendible bed (an upper bed that slides on a lower bed). Slide it to the right, and a gap opens. Now, you have a full 60" swing! Also, for extra long work, there is 50% greater center distance. And the rest of the time you have a regular 32" heavy duty lathe for a wide variety of work.

3 lathes in one—at the cost of a lathe and a half!

Here's an example of how this extra capacity pays off. Alliance Tool and Die Corp., Rochester, N. Y. are specialists in unusual machining problems, like precision molds—and the bulky compressor wheel, shown here. How did they turn it before? They didn't. The part was too big. Now, with their 32"/60" LeBlond (recommended by Macaulay Machinery Co., Rochester, N. Y.) they take jobs like this right in stride. Actually, this particular order was made possible by this lathe.

If you do job shop work, you can consider this lathe a business-getter. If you're doing your own maintenance, it gives you the capacity to do virtually all your own turning work. LeBlond Sliding Bed Gap Lathes are available in 4 sizes—16"/38", 25"/50" and 32"/60" (shown) Heavy Duties and the 17"/28" Regal. You're sure of getting the right lathe for your job when you buy LeBlond. There are 76 lathe models to choose from. Call your LeBlond Distributor or write.

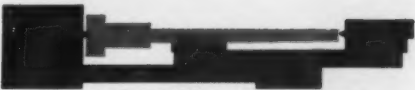
**Here's how the LeBlond
Sliding Bed Gap Lathe
gives you extra capacity
for extra large work:**



BED GAP CLOSED—functions as a regular 32" lathe.



BED GAP OPEN—full 60" swing.



BED FULLY EXTENDED—50% greater center distance.

... cut with confidence

THE R. K. LEBLOND MACHINE TOOL COMPANY

Cincinnati 8, Ohio



World's Largest Builder of a Complete Line of Lathes for More than 71 Years

For more data circle 316 on Postpaid Card

when
TIME
means
the
order...



Cincinnati HYDRAGUIDE® Tracer Lathes are designed to *save time* . . . in operating, job change-over, maintenance. Just push a button for lowest-cost tracer machining . . . no interference with standard lathe operation.

And, economy-priced Cincinnati Lathes are husky and versatile enough to handle some of the jobs that often tie up heavy-duty machines.

Do you have the new booklet, "How to Determine if a Lathe will be a Money-Maker"? See your CL&T Dealer, or write us direct.

Improved Machining Through Research

CINCINNATI LATHE AND TOOL CO.

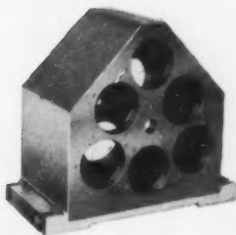
3207 Disney Street • Cincinnati 9, Ohio

"TRAY-TOP" Lathes / "CINCINNATI" Drilling Machines / "SPIROPOINT" Drill Sharpeners

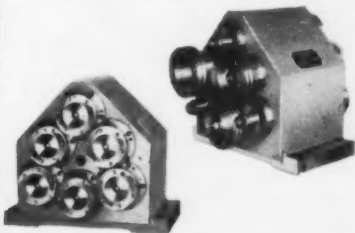
For more data circle 317 on Postpaid Card



here's a
**PRECISION
SIX-HOLER**
*with a hole-to-hole tolerance
of two ten-thousandths*



the **POPE**
Special **6-SPINDLE
BORING HEAD**



equipped with
POPE
**Heavy Duty Precision
Boring Spindles**



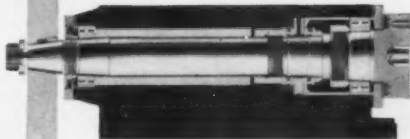
the Spindles that are capable of boring holes round within *millionths of an inch*, and that produce fine surface finishes in the lower micro inch range.

POPE designs, engineers and builds a wide range of **SPECIAL SPINDLES**

This sectional view shows you why Pope Boring Spindles provide dependable, trouble-free operation and continuous production of accurate parts.

Roller bearings rigidly support the tool for smooth, chatter-free operation.

Preloaded, super-precision thrust bearings eliminate endwise movement of the shaft in either direction.



No. 123

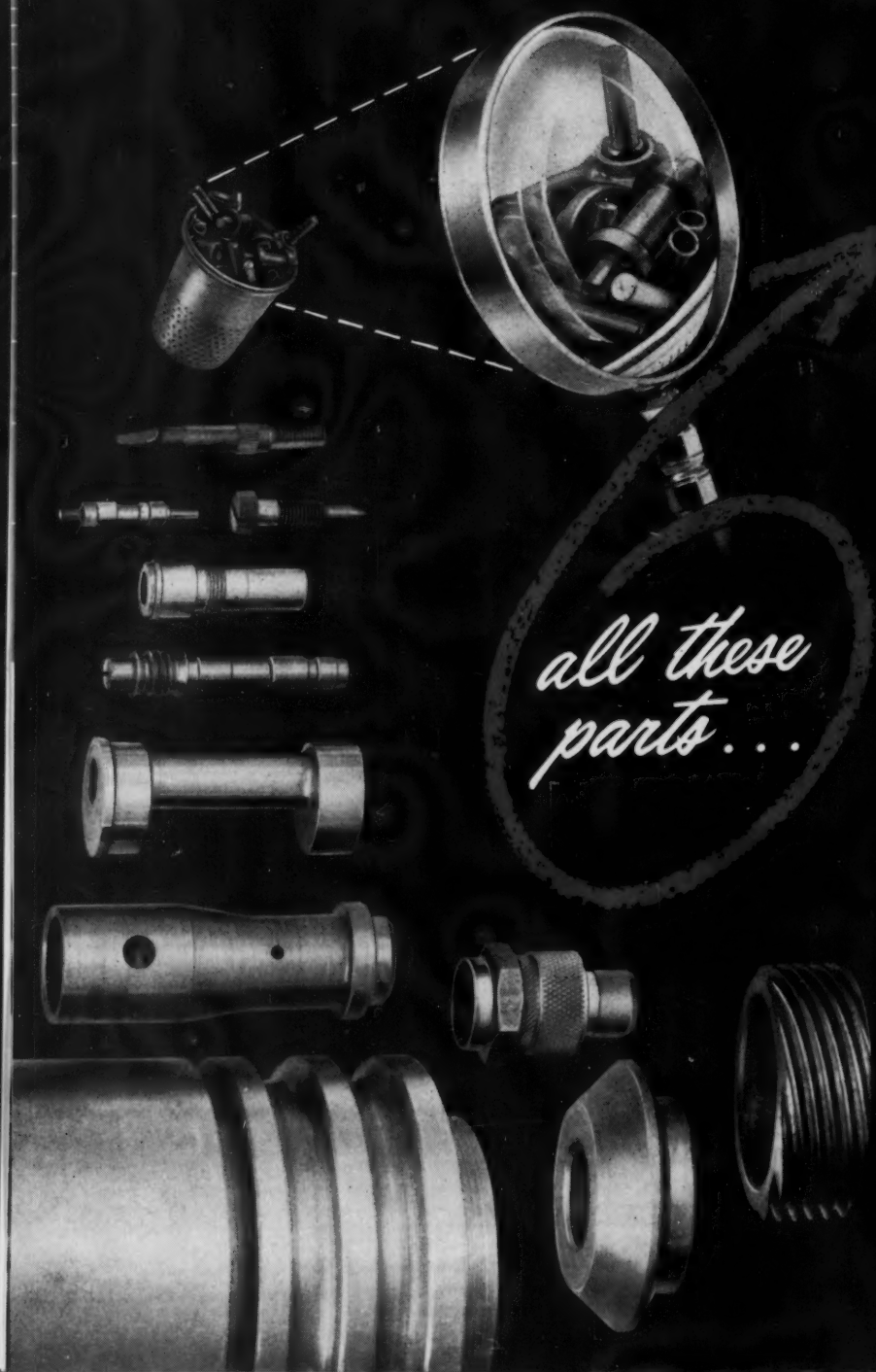
POPE

**ENGINEERS AND BUILDS STANDARD AND SPECIAL
PRECISION ANTI-FRICTION BEARING SPINDLES
FOR EVERY PURPOSE**

POPE MACHINERY CORPORATION • 261 RIVER STREET • HAVERHILL, MASS.

Established 1920

For more data circle 318 on Postpaid Card



*all these
parts...*

P
W

No
the
The
can
or p
mac
oper
A
sult



TH
SAL

Produced on *Acme-Gridley* Automatics without secondary operations

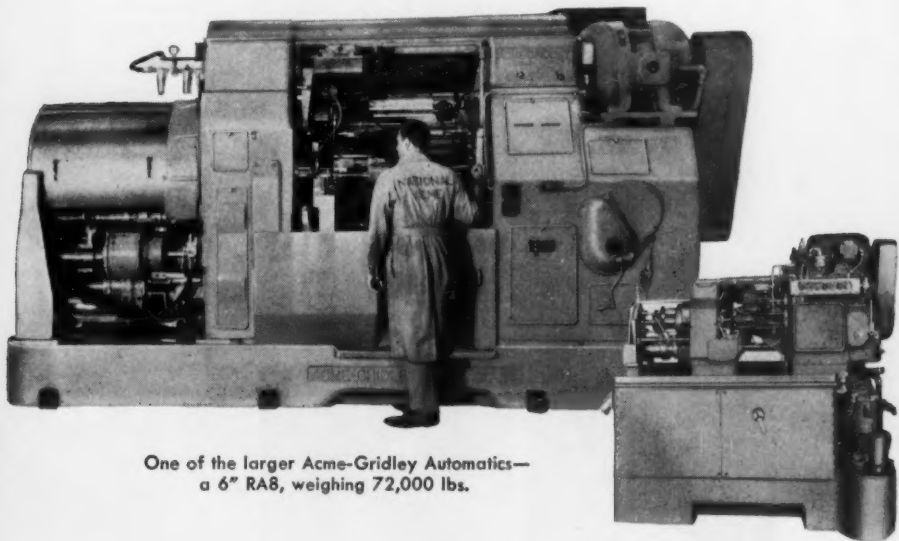
The parts illustrated show only a small sampling of the range of capacities.

No line of automatic production equipment in the world equals Acme-Gridley in capacity range. These Automatics produce parts so small they can be examined only under a magnifying glass, or parts weighing a hundred pounds. Most parts machined on Acme-Gridleys require no secondary operations, this means no costly extra handling.

Acme-Gridley's outstanding performance results from a combination of design features in-

cluding rigid box-type construction, ample "beef" properly distributed, and a wide open tooling zone. The tooling zone lends itself to a broad range of tooling installations limited only by the tool engineer's ingenuity.

Find out how you can put Acme-Gridley Automatics to work for you turning out parts at lower cost and highest accuracy—our representative will be glad to call without obligation.



One of the larger Acme-Gridley Automatics—
a 6" RA8, weighing 72,000 lbs.

Newest Acme-Gridley, the $\frac{3}{8}$ " RA6,
weighs only 5,200 lbs.

National Acme

THE NATIONAL ACME COMPANY, 183 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES:

• Newark 2, N. J. • Chicago 6, Ill. • Detroit 27, Mich.

For more data circle 320 on Postpaid Card



NEW

HYDRAULIC

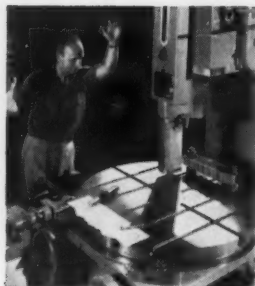
SLOTTER OFFERS BOTH

tracing and conventional slotting

Here's a powerful new Hy-Draulic Slotter capable of doing both conventional slotting and complicated tracing work. Rotary tracing and straight work are handled by a transverse movement of the saddle. Equipped with a highly sensitive, precision-engineered Kopy-Kat Duplicator, this slotter will actually produce its own working templates from a toolroom master, or from a finished workpiece.

Design features of this versatile new machine include powerful fulcrum drive to the ram, hydraulic feeds and power rapid traverse in all directions, and pendant controlled cutting speed changes.

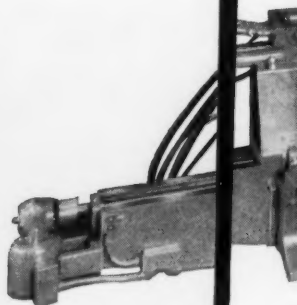
See your Rockford Machine Tool Co. representative, or write us directly, for the complete information on this new Hy-Draulic Slotter.



tracing



conventional slotting

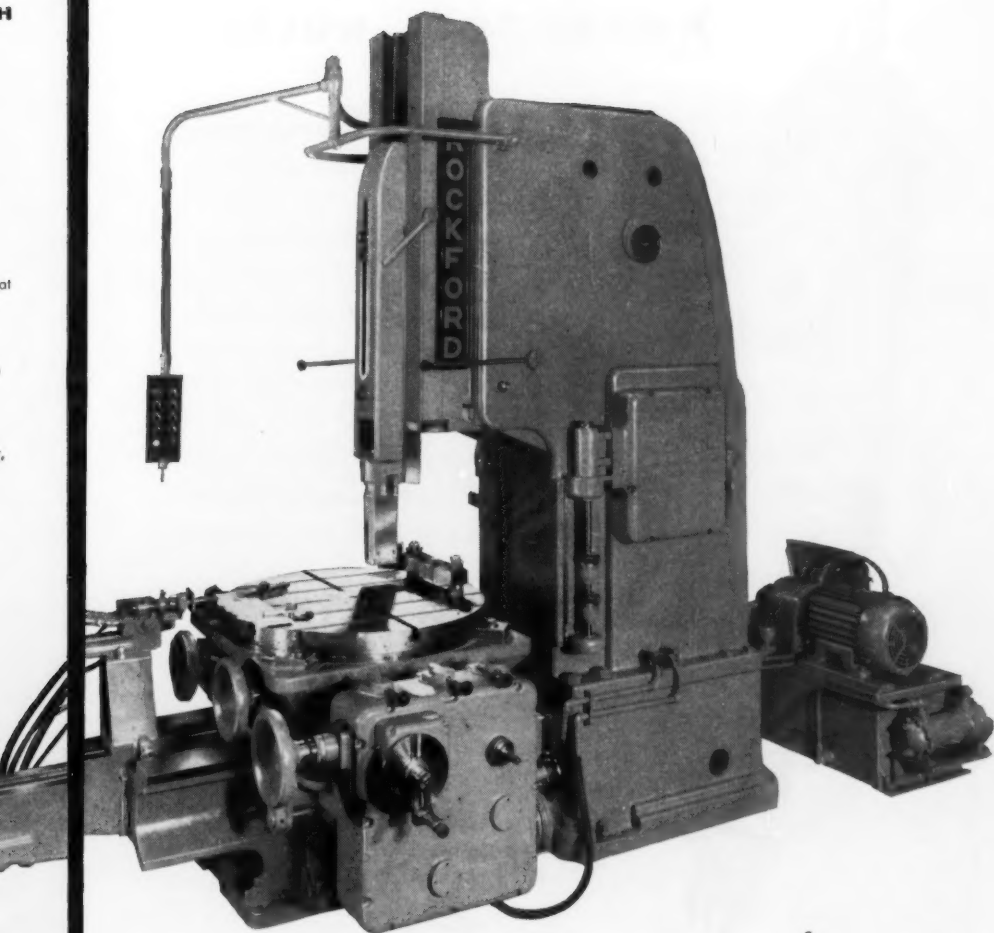


H

ot

g

g



ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

For more data circle 322 on Postpaid Card

June, 1958

modern machine shop 21

NEW! BOKUMATIC RECESS TOOL HOLDER



A new standard automatic recessing tool holder has been introduced by Bokum Tool Company. Designed to accommodate Bokum standard "O" ring, retaining ring, back chamfering and thread relief cutting tools, the tool holder features a double cam action for chatter-free, precision operation. It can be used on standard drill presses, radial drills, turret lathes and chucking machines. Write for complete information.

BOKUM TOOL COMPANY, INC.

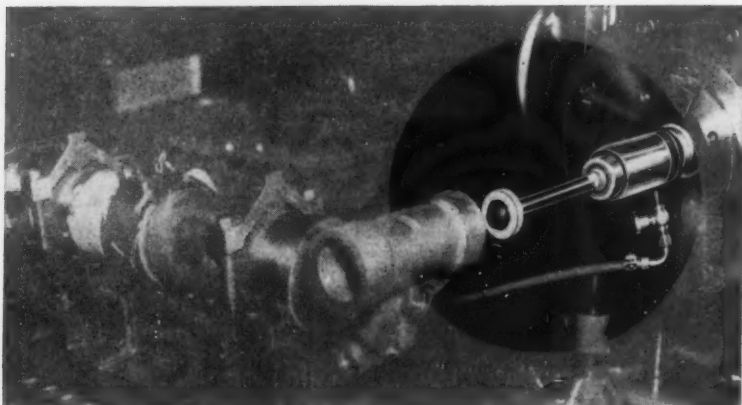


14775 WILDEMERE AVENUE
DETROIT 38, MICHIGAN



For more data circle 323 on Postpaid Card

H LES JIG GROUND with *Vulcanaire*



SPECIAL VULCANAIRE ON A BORING MILL

Micro-finish and accuracy required on this large part. Vulcanaire 20,000 Series, with special grinding spindle, ground the hole to specifications. By controlling speed at ANY point you eliminate need for a variety of types and kinds of constant speed spindles.

Borrow our
instructive
11 minute
movie on
Jig Grinding.

SERVICES OF YOUR TOOL ROOM IN DAYTON
ENGINEERING • PROCESSING • BUILDING • TOOLS
DIES • SPECIAL MACHINES • VULCANAIRE JIG
GRINDERS • MORTORIZED ROTARY TABLES • BREHM
"SHIMMY" AND RELATED DIES • AUTOMATION

VULCAN TOOL CO., YOUR TOOL ROOM IN DAYTON
710 LORAIN AVENUE • DAYTON 10, OHIO



For more data circle 324 on Postpaid Card

June, 1958

modern machine shop 23

New No. 4-4 Sharpening Machine Features—

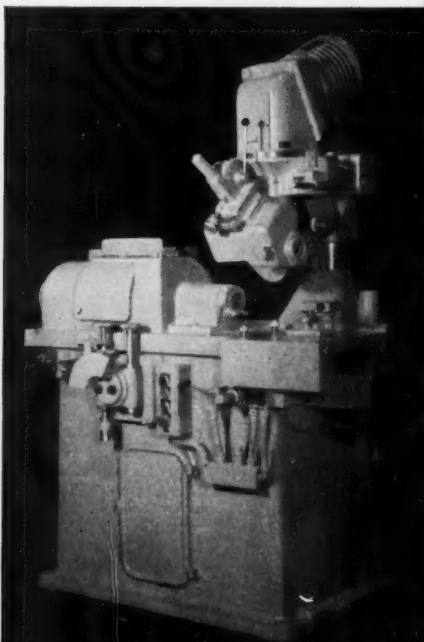
INFINITELY VARIABLE TABLE SPEEDS, AD

Air-Draulic actuation

provides convenient power, smooth operation, minimum maintenance.

This new No. 4-4 Sharpening Machine is an automatic sharpening machine for sharpening hobs and form-relieved cutters. It has air-draulic table actuation, adjustable stroke length, infinitely variable table speeds, and built-in wheel dresser for work up to 4" diameter and 4" long. It offers convenient set-up and reduced sharpening time, with positive mechanical control over all sharpening elements. Spacing, lead of flute and radialism are held within tolerances for all accuracy classifications including Class AA hobs.

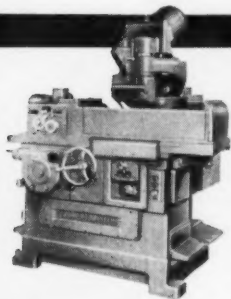
The new closed air-draulic system has no piping, hydraulic motor or tanks. Leakage is not a problem as with most hydraulic systems. The air-draulic system connects readily with compressed air lines available in most shops. This combination of air and hydraulic pressures provides smoothness and infinite adjustment in machine operation, and offers cost advantages in machine maintenance. Table speed is adjustable from 5 to 35 strokes per minute at a $7\frac{3}{4}$ " stroke. Length of stroke can be adjusted from 3" to $7\frac{3}{4}$ ". Wet grinding is optional at extra cost.



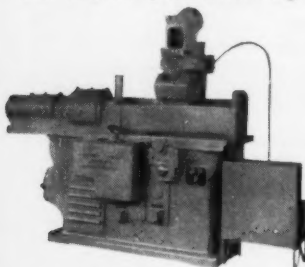
New Model No. 4-4 Automatic Sharpening Machine reduces set-up and sharpening time through stroke control and infinitely variable table speeds.

Your present machines may be factory-rebuilt! If you have No. 4-4 Automatic Sharpening Machines in your shop, Serial No. 100 or later, you may have them completely rebuilt at the factory, incorporating these new machine features and air-draulic system. Factory rebuilt machines have all of the features of a new machine, and carry a new machine guarantee. Write Dept. 13 for details and estimate of cost for rebuilding your present machines. New illustrated bulletin supplies complete information on new machines.

OS, ADJUSTABLE STROKE!



No. 6-5 is a precision sharpening machine, with wet grinding as a standard feature, making it ideal for sharpening carbide tools. Takes work up to 6" dia. x 5" long



No. 10-12 is a heavy duty machine, built to accomodate work up to 10" dia x 12" long. Wet grinding attachment is available as extra equipment.

*Hob and cutter sharpening
is on a production basis with
Barber-Colman automatic sharpening!*

Barber-Colman Sharpening Machines sharpen hobs and cutters cheaper, faster and more accurately than can be done by any other method. They provide repeat accuracy and automatic operation for either large run or job-lot sharpening. Accurate sharpening is important to tool life, and must be maintained if the tools are to cut accurate parts. In addition to the newly improved No. 4-4, two other sharpening machines are built by Barber-Colman to provide a complete range of sharpening for hobs and form-relieved cutters up to 10" diameter by 15" length. If you have hob or cutter sharpening problems, consult Barber-Colman engineers for help in meeting production requirements.

BARBER-COLMAN COMPANY

6 6 6 ROCK STREET • ROCKFORD, ILLINOIS

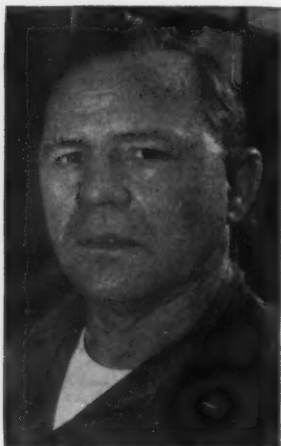
Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines



For more data circle 326 on Postpaid Card

How U. S. Steel Supply's Special Services

"cut production time"



reported by **Mr. O. G. Olmsted**
Owner and Operator—Olmsted & Sons
Chicago, Illinois

"We were manufacturing one of our products from a metal that was so hard it forced us to resharpen bits and drills at least ten times a day, causing a costly two hour production loss each day," says Mr. Olmsted.

"However, we invited one of U. S. Steel Supply's representatives to analyze our problem, and he suggested a change to USS MX* steel. The results were immediate.

"We now have to sharpen bits and drills *only* every other day, and we're able to machine much faster without risking chipping or breakage. Our product is improved, there's an increased demand for it, and operating costs are lower."

Here's how these Special Services can work for you!

U. S. Steel Supply offers this same invaluable metallurgical assistance to you, *plus* the availability of flame-cutting, shearing, slitting and coiling equipment. If you want one of our representatives to show you how to benefit from U. S. Steel Supply's Special Services, write to U. S. Steel Supply at the address below.

Remember . . . you get Any Steel, Anywhere, Any Time Service from . . .

U. S. Steel Supply
Division of



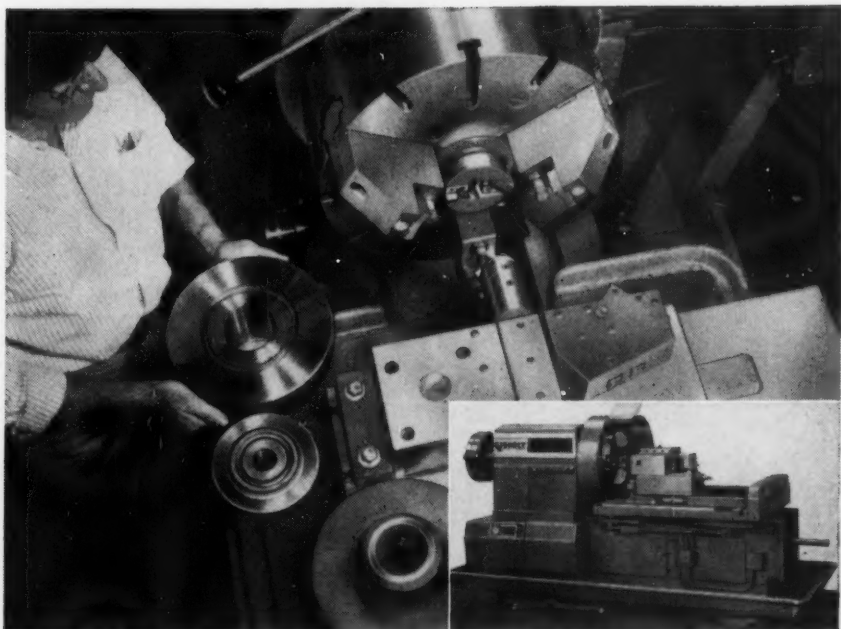
*TRADE MARK

United States Steel

Steel Service Centers Coast to Coast

Mailing Address: P. O. Box 1099, Dept. R6, Chicago 90, Ill. • General Offices: 208 So. LaSalle St., Chicago 4, Ill.

For more data circle 327 on Postpaid Card



Smart planning on Simplimatic holds f.t.f. time to 1.7 min. on $6\frac{1}{4}$ " diam., 3.3 min. on $10\frac{3}{4}$ " diam. workpieces.

How OTM Corp. cuts costs machining parts in 13 sizes

Handles each part in single chucking, using Simplimatic with back-facing attachments and two-speed motor

You may get ideas from the way OTM Corporation, Houston, Texas, machines steel welding neck flanges and welding necks—with each part in 13 different sizes—completing each part in a single chucking and holding change-over time to an absolute minimum.

Here's how the job is done on a Gisholt Simplimatic Automatic Lathe: Facing, grooving, boring and chamfering operations are performed from tools on short tool slides, with T-slotted tops for quick adjustment. Relieving the boring tool at the end of the cut eliminates tool tracks. Simultaneously, a special back-facing attachment works through the spindle to shave-face and chamfer the O.D. on the hub. A power chuck wrench operates the scroll chuck and permits mounting this attachment in the spindle bore. A two-speed motor

provides correct surface speed and permits switching from high speed (for turning and facing) to low speed (for grooving operation) and back again, during the Simplimatic's automatic machining cycle.

Here, again, the Gisholt MASTERLINE Simplimatic Automatic Lathe saves a manufacturer the cost of a special machine. Its extra wide platen table provides ample space for an infinite number of slide and tool arrangements—and its table feed permits tools to engage with the work or perform additional machining operations before actual slide movements begin. Ask your Gisholt Representative to show you how the Simplimatic performs special machine functions at standard machine prices—on your product and under your production conditions.



GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

WRITE GISHOLT TODAY for new Catalog 1159-C on Gisholt MASTERLINE Simplimatic Automatic Lathe. Shows 39 typical jobs—fully illustrated.

ASK YOUR GISHOLT REPRESENTATIVE ABOUT GISHOLT FACTORY REBUILT MACHINES WITH NEW MACHINE GUARANTEE
For more data circle 328 on Postpaid Card

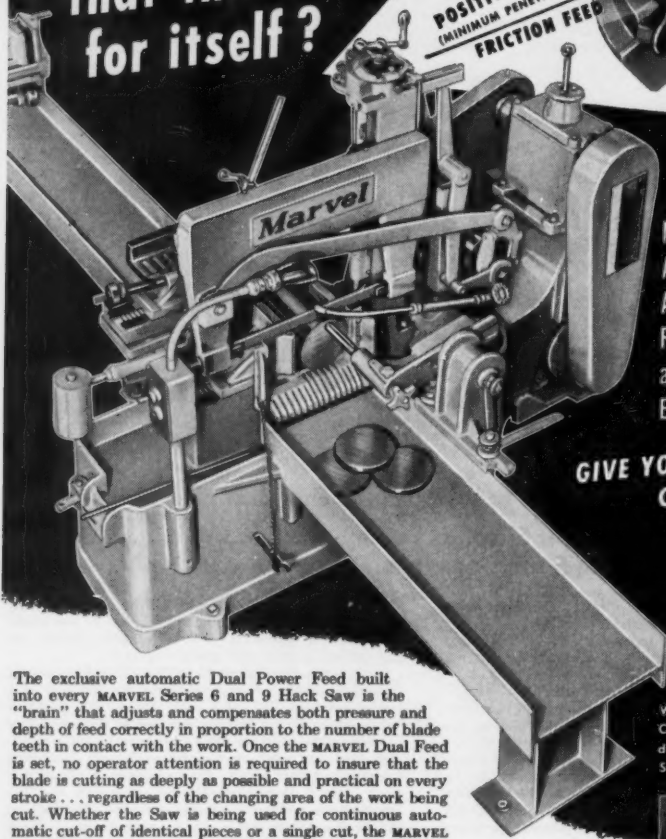
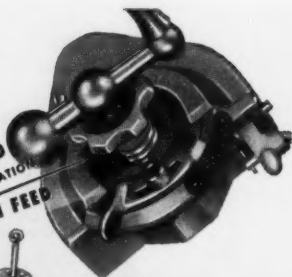
June, 1958

modern machine shop 27

ever see a METAL SAW

that thinks
for itself?

POSITIVE FEED
MINIMUM PENETRATION
FRICTION FEED



MARVEL SAWS'
Automatic "Brain"
Adjusts Blade
Feed Pressure
and Depth on
Every Stroke to

GIVE YOU FASTER
CUTTING-OFF

The exclusive automatic Dual Power Feed built into every MARVEL Series 6 and 9 Hack Saw is the "brain" that adjusts and compensates both pressure and depth of feed correctly in proportion to the number of blade teeth in contact with the work. Once the MARVEL Dual Feed is set, no operator attention is required to insure that the blade is cutting as deeply as possible and practical on every stroke . . . regardless of the changing area of the work being cut. Whether the Saw is being used for continuous automatic cut-off of identical pieces or a single cut, the MARVEL Dual Feed that practically "thinks for itself" guarantees that the work is cut-off in the fewest possible number of strokes.

Heavy duty MARVEL Series 6 and 9 Hack Saws embody every practical design and operating feature to give you speed, accuracy and operating economy you can find in no other metal cutting saws.

Write for the MARVEL
Catalog and complete
details on MARVEL
Saws



PS-1304

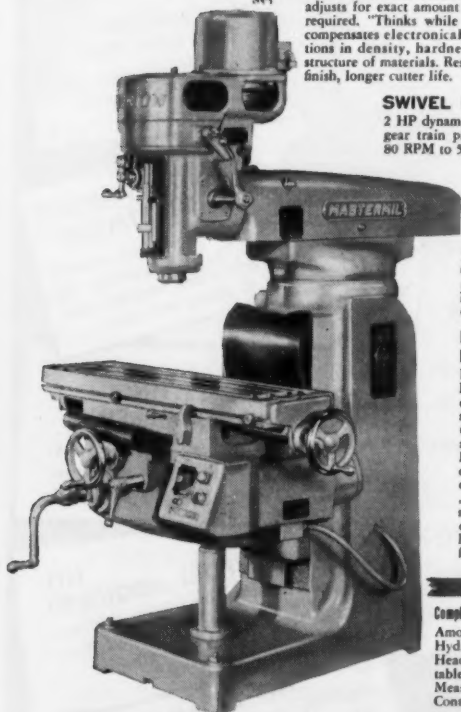
ARMSTRONG-BLUM MFG. CO.
5700 BLOOMINGDALE AVE. - CHICAGO 39, ILL.

MARVEL Metal Cutting
SAWS
Better Machines - Better Blades

For more data circle 329 on Postpaid Card

Eventually you'll buy a GORTON MASTERMIL

here's why



DYNA-DRIVE "The Torque-Thinking" Table Feed

"Feels as it feeds" . . . automatically adjusts for exact amount of torque required. "Thinks while it works", compensates electronically for variations in density, hardness, molecular structure of materials. Result: Superbly fine finish, longer cutter life.

SWIVEL HEAD

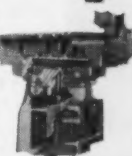
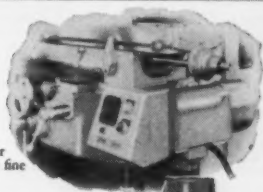
2 HP dynamically balanced motor with belt and gear train provides wide range of speeds from 80 RPM to 5,600 RPM. Head swivels 90° left or right, head, ram and turret rotate 180°. Cross movement 14 inches. Push button starting.

DOWN FEED INFINITELY VARIABLE

Feeds may be varied infinitely from 0" to 5" independent of spindle speeds. High efficiency belt drive. Direction and rate of feed separately controlled.

PERMANENT ACCURACY BUILT-IN

Distortion is prevented by extra heavy one-piece column cast with over-size ribbing . . . extra heavy alloy steel turret clamping bolt (1½" dia) with 3-point clamping action . . . heavy dovetail way full length of vertical column face . . . extra large table, knee and 24" saddle (2" longer than table travel) . . . square lock bearings with long, narrow guide between knee and saddle . . . positive locks . . . extra heavy feed screws . . . bearing surfaces hand-scraped.



Complete Versatility Through Attachments Built-in or Field Installed.

Among such equipment is, Trace-Master Hydraulic Tracer Control, Duplicator Tracer Head and/or Table with base, saddle and table in one unit, 6" Raising Block, End Measuring Rods and Dial Indicators, Self-Contained Coolant System.

Write for Bulletin 2699-1706.



© 1958 George Gorton Machine Co.

GEORGE GORTON MACHINE CO.

1706 RACINE STREET

RACINE, WISCONSIN

SINCE 1893

Tracer-Controlled Pantographs, Duplicators—standard and special . . . Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 330 on Postpaid Card

A8-1008

June, 1958

modern machine shop 29

TAYLOR

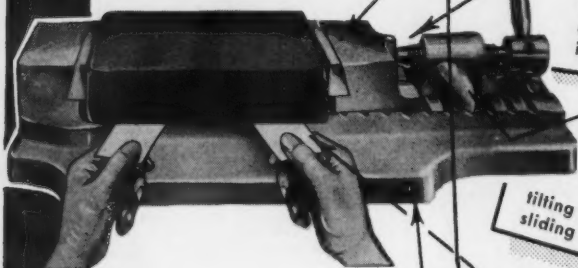
YOUR FAVORITE VICE

HOLD DOWN VISES

"The Largest Opening for
Jaw Size"

3 inch—7 inch between jaws

8 inch—18 inches
between jaws



TAYLOR FEATURES 24 sizes
and 10 models . . . the great-
est selection of fine vises you
can find.

CALL, WRITE OR WIRE TO-
DAY FOR FULL INFORMA-
TION!

WHARTON UNITOOLS

VALLEY STREAM, L. I., N. Y.

**TAPER, SPRING
LOADED JAWS**

Automatically pulls the work
down on to the vise body.

**UNEVEN AND TAPER
CASTINGS EASILY HELD**

The swivelling loose jaw
automatically positions
itself to the work.

**QUICK, POSITIVE
ADJUSTMENT**

Vise instantly opened
to full capacity by
tilting grip plate forward and
sliding it along the vise.

**NO SETTING
NO HAMMERING**

The jaws do all the work.
You can't pull out the paper
once the jaws are tightened.

**NO
EFFORT REQUIRED**

To tighten the jaws ordinary
hand pressure on small tolly
lever is all that is required.

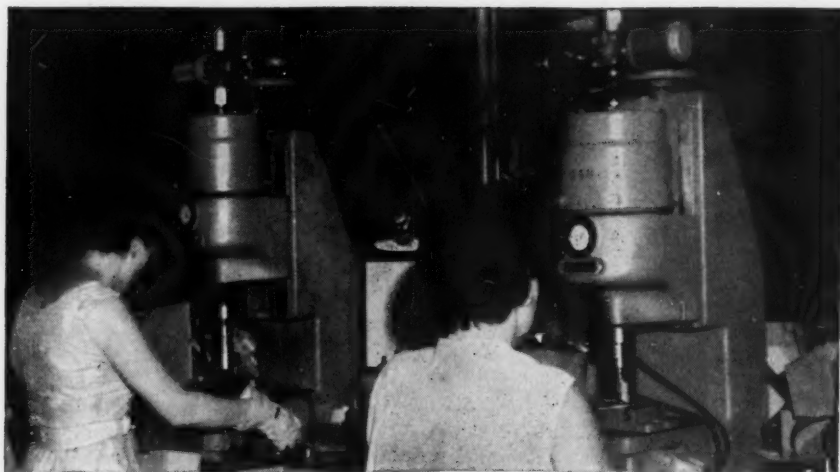
NO BREAKAGES

Specially designed extra strong body
takes all the necessary strains.

LARGE SIDE FLANGES

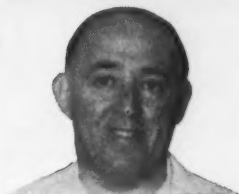
For ease in strapping vise to the ma-
chine table.

For more data circle 331 on Postpaid Card



"famco AIR PRESSES— as important as our right hand!"

*E. C. STEINBACH, vice president of
Peirce Dictation Systems*



"The versatility," continues Mr. Steinbach, "of our Famco AIR PRESSES really pays us big dividends in speedy, efficient production and lower operating costs."

In fact, management at Peirce Dictation Systems—manufacturer of precision dictating systems for industry—has found that their two AIR PRESSES perform operations they never thought possible.

And, whether they are riveting, stamping or pressing the pressure is always smooth and full.

Find out today how your production line can benefit with Famco AIR PRESSES. With more than 40 models to select from—either single or double acting—you'll find a dependable Famco AIR PRESS that will give you plenty of versatility, can lower your manufacturing costs and speed production. Write for FREE catalog.



famco machine company

3122 SHERIDAN ROAD • KENOSHA 6, WISCONSIN

AIR PRESSES • ARBOR PRESSES • BAND SAWS • DRILL PRESSES • FOOT PRESSES • POWER PRESSES • SQUARING SHEARS • MILLING MACHINES

For more data circle 332 on Postpaid Card

June, 1958

modern machine shop 31

F O P

, Ohio

310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334

MONEY-SAVING COMBINATION FOR ANY MACHINE SHOP



CARMET TOOL HOLDERS AND INDEXABLE INSERTS

To help you get every advantage from carbide cutting tools—high production, operating efficiency and economy—Carmet offers a full line of improved-design tool holders—over 115 styles and sizes to choose from in both positive and negative rake.

And Carmet Indexable inserts are available in more than 20 styles and sizes and in six different carbide grades—each insert permanently marked for positive grade identification—to give you top cutting performance.

Carmet tool holders and Indexable inserts make machining with carbides practical for any size plant. Match a Carmet tool to your requirements—or let Carmet give you engineering assistance in setting up a complete tooling program—and watch your production climb as costs go down. Inquire today.

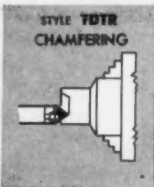
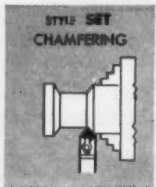
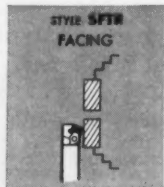
• **Allegheny Ludlum Steel Corporation,**
Carmet Division, Detroit 20, Mich.

Write for this NEW CATALOG CARMET TOOL HOLDERS and INDEXABLE INSERTS



Expanded to 16 pages, this latest edition contains specifications of Carmet tool holders and Indexable inserts, replacement parts for tool holders, and information on choosing the proper carbide grade for the job.

ADDRESS DEPT. MS-6



WSW 6001

For all your CARBIDE needs, call
ALLEGHENY LUDLUM

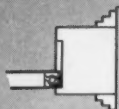
Branch offices and distributors in all principal cities

For more data circle 333 on Postpaid Card

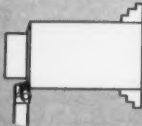


MATCH THE TOOL TO THE JOB

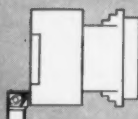
STYLE TATR COUNTERBORING



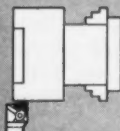
STYLE SBTR
HEAVY-DUTY TURNING



STYLE TFTR FACING



STYLE TGTR FACING



↓ Use this Postpaid Card for requesting more information on products described and advertised ↓

READER SERVICE CARD

JUNE, 1958

Your Name

Your Title

Company Name

Company Address

City

Zone

State

Products Manufactured

Number of Plant Employees

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

EDITORIAL ITEMS

1	26	51	76	101	126	151	176	201	226	251	276
2	27	52	77	102	127	152	177	202	227	252	277
3	28	53	78	103	128	153	178	203	228	253	278
4	29	54	79	104	129	154	179	204	229	254	279
5	30	55	80	105	130	155	180	205	230	255	280
6	31	56	81	106	131	156	181	206	231	256	281
7	32	57	82	107	132	157	182	207	232	257	282
8	33	58	83	108	133	158	183	208	233	258	283
9	34	59	84	109	134	159	184	209	234	259	284
10	35	60	85	110	135	160	185	210	235	260	285
11	36	61	86	111	136	161	186	211	236	261	286
12	37	62	87	112	137	162	187	212	237	262	287
13	38	63	88	113	138	163	188	213	238	263	288
14	39	64	89	114	139	164	189	214	239	264	289
15	40	65	90	115	140	165	190	215	240	265	290
16	41	66	91	116	141	166	191	216	241	266	291
17	42	67	92	117	142	167	192	217	242	267	292
18	43	68	93	118	143	168	193	218	243	268	293
19	44	69	94	119	144	169	194	219	244	269	294
20	45	70	95	120	145	170	195	220	245	270	295
21	46	71	96	121	146	171	196	221	246	271	296
22	47	72	97	122	147	172	197	222	247	272	297
23	48	73	98	123	148	173	198	223	248	273	298
24	49	74	99	124	149	174	199	224	249	274	299
25	50	75	100	125	150	175	200	225	250	275	300

ADVERTISEMENTS

301—Front Cover	410	435	460	485	510	535	560	585	610
302—Inside Front Cover	411	436	461	486	511	536	561	586	611
303—Inside Back Cover	412	437	462	487	512	537	562	587	612
304—Back Cover	413	438	463	488	513	538	563	588	613
305	326	347	368	389	414	439	464	489	514
306	327	348	369	390	415	440	465	490	515
307	328	349	370	391	416	441	466	491	516
308	329	350	371	392	417	442	467	492	517
309	330	351	372	393	418	443	468	493	518
310	331	352	373	394	419	444	469	494	519
311	332	353	374	395	420	445	470	495	520
312	333	354	375	396	421	446	471	496	521
313	334	355	376	397	422	447	472	497	522
314	335	356	377	398	423	448	473	498	523
315	336	357	378	399	424	449	474	499	524
316	337	358	379	400	425	450	475	500	525
317	338	359	380	401	426	451	476	501	526
318	339	360	381	402	427	452	477	502	527
319	340	361	382	403	428	453	478	503	528
320	341	362	383	404	429	454	479	504	529
321	342	363	384	405	430	455	480	505	530
322	343	364	385	406	431	456	481	506	531
323	344	365	386	407	432	457	482	507	532
324	345	366	387	408	433	458	483	508	533
325	346	367	388	409	434	459	484	509	534

431 Main Street, Cincinnati 2, Ohio

DO NOT WRITE IN THESE SPACES

modern
machine
shop

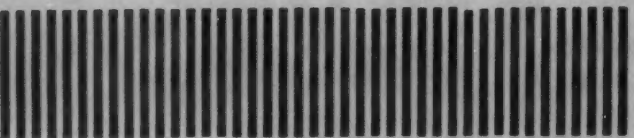
BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

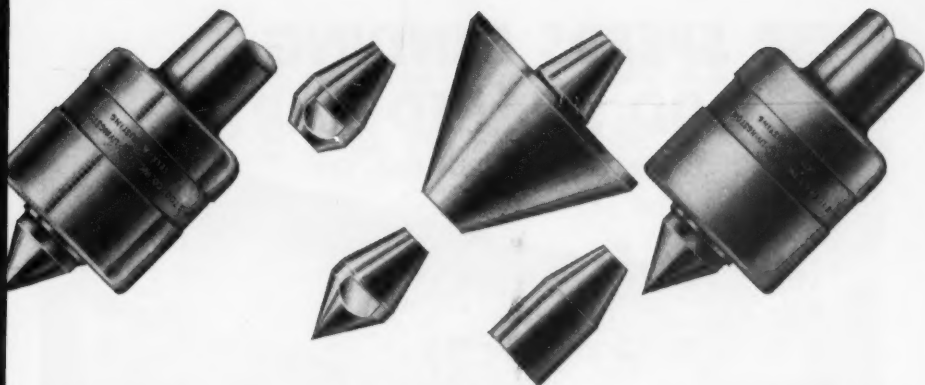
5 C POSTAGE WILL BE PAID BY—

**modern
machine
shop**

**431 MAIN ST.
CINCINNATI 2, OHIO**

FIRST CLASS
PERMIT No. 1702
CINCINNATI, OHIO





Famous Perfection
Grinding Live Center

Accurate Detachable Points
H.S.S. and Carbide

Expansion Compensating
Lathe Centers

ANNOUNCING THE FIRST COMPLETE LINE OF PRECISION-BUILT LIVE CENTERS

INCLUDING 5 TYPES OF
EXPANSION COMPENSATING CENTERS

- the only complete line
- the only guaranteed self-adjusting
live center

INTRODUCING J & S Tool Company's complete new line of live centers with accuracy better than .0001", with these features:

- Guaranteed one year.
- Self-adjusting bearing take-up.
- RPM speeds up to capacity of present-day machines.
- Correct capacity rating.
- Hardened and ground throughout.

Write today for a free copy of the J & S Live Center Catalog.

J & S TOOL CO., INC.

880 Dorsa Avenue

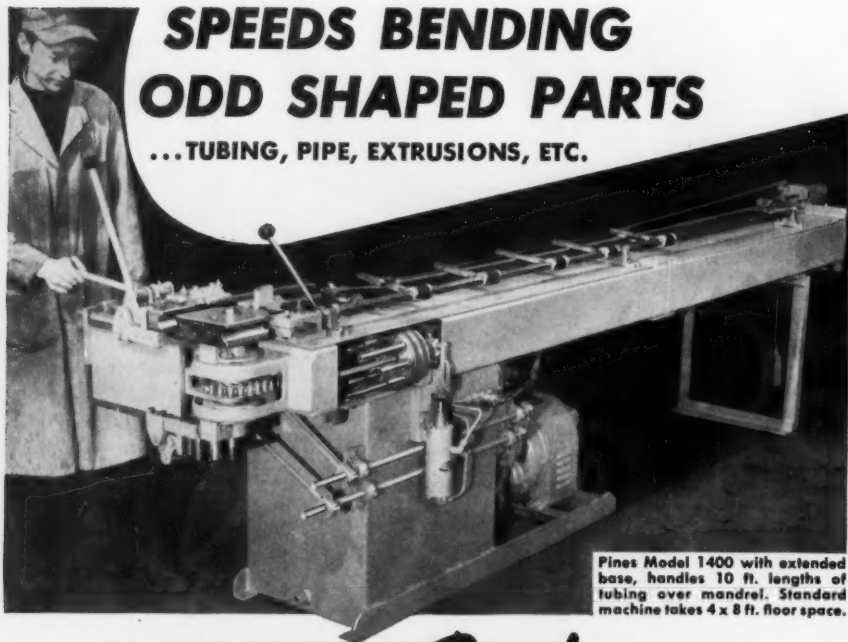
LIVINGSTON, NEW JERSEY

J & S TOOL CO., INC., ALSO MANUFACTURES FLUIDMOTION WHEEL DRESSERS
CLAMPS • NO-BEND MILLING ARBORS AND CLAMPCUT MILLING VISES

For more data circle 334 on Postpaid Card

SPEEDS BENDING ODD SHAPED PARTS

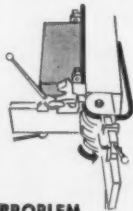
...TUBING, PIPE, EXTRUSIONS, ETC.



Pines Model 1400 with extended base, handles 10 ft. lengths of tubing over mandrel. Standard machine takes 4 x 8 ft. floor space.

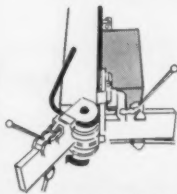
PINES 2-IN-1 Bender

ADVANTAGES OF PIVOTING HEAD



PROBLEM

Counter-clockwise rotation results in work piece striking machine base.



SOLUTION

Changed to clockwise operation, machine makes 120° bend without interference.

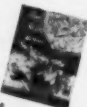
New Model 1400 Handles Both Clockwise and Counter-Clockwise Operations . . .

For experimental, small lot, and production work, Pines Model 1400 Bender offers outstanding advantages. Designed with double tool-holder ways and a pivoting head assembly, you can handle multiple planes and odd shapes fast and efficiently. Change-overs from clockwise to counter-clockwise operation can be made in about two minutes. Designed for handling bars, rolled shapes, extrusions, and tubing up to 1 1/4" O.D., the machine features economical, quick-change tooling, smooth, hydraulic operation, and degree-of-bend turret selector. Typical production speed is 300 to 400 bends per hour.

PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery 643 WALNUT • AURORA, ILLINOIS

WRITE FOR NEW CATALOG . . .

Gives latest information, specifications, and production and tooling data.



PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

For more data circle 335 on Postpaid Card

FOR ECONOMICAL OPERATION CLEVELAND PRESSES

with patented Cleveland Drum Type Friction Clutch



Investigate the savings in production costs with any of Cleveland's eleven different types of presses—each available in a wide range of sizes and capacities—equipped with the patented Cleveland Drum Type Friction Clutch.

Designed with a minimum number of parts, this patented Cleveland clutch weighs less, uses less power, is easily adjusted, can be readily serviced right on the press. It assures minimum downtime, lower operating costs, quicker starting and stopping to boost production.

With Cleveland Presses you can do more different metalworking operations per press, use automatic feeds, get better quality production, longer die life, minimum maintenance and lower per-part cost.

That's why we suggest you investigate the advantages Cleveland Presses offer.

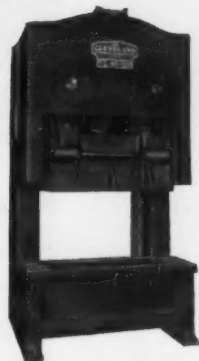


E. 40th and St. Clair Avenue, Cleveland 14, Ohio

Offices

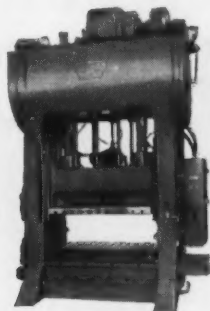
NEW YORK
DETROIT
CHICAGO
PHILADELPHIA
EAST LANSING
CINCINNATI

Power Presses
Fabricating Tools
Punching Tools & Dies

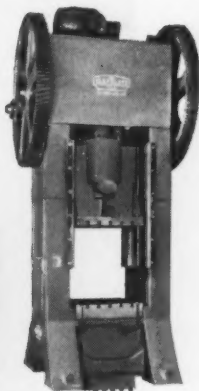


Straight-sided,
single crank press

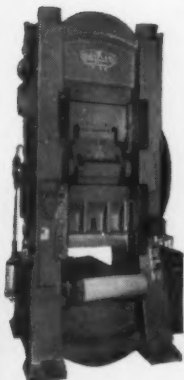
Double crank
open back gap press



Two-point
straight-sided press

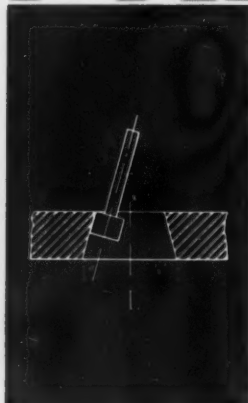


Knuckle joint press

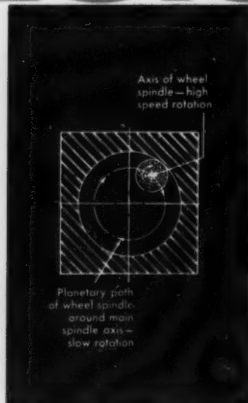


For more data circle 336 on Postpaid Card

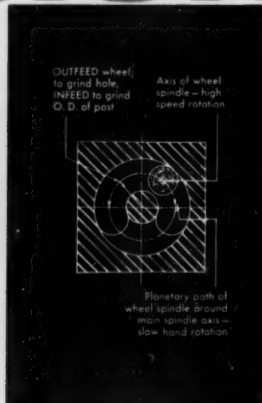
PRECISION



TAPER
(and straight)



PLANETARY



CONTOUR
(with head)

MOORE- FOSDICK JIG GRINDER

A new degree of speed, convenience and capacity is brought to precision grinding in the Moore-Fosdick Jig Grinders. This combination of the unique Moore Grinding Head with Fosdick Jig Borer Tables makes possible advantages never before available.

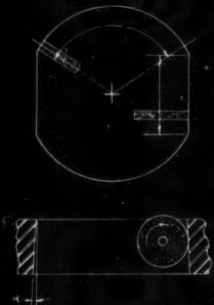
All standard jig grinding operations can speedily and conveniently be accomplished on the Moore-Fosdick, in addition to many which were formerly known as "trick" operations. Both straight and tapered holes can be located and ground, as well as contours consisting of radii and tangents or chordal surfaces.

The angular and indexing device built into the main spindle and the slot grinding attachment permit quick, accurate grinding of any contour, regular or irregular. Setting work on a rotary table is unnecessary except for angular surfaces. Chop grinding removes stock rapidly and makes contour grinding even faster.

An infinite range of grinding speeds—from 12,000 to 60,000 rpm—allows accurate control

GRINDING

OF LARGE WORK



CONTOUR (with slot grinder)

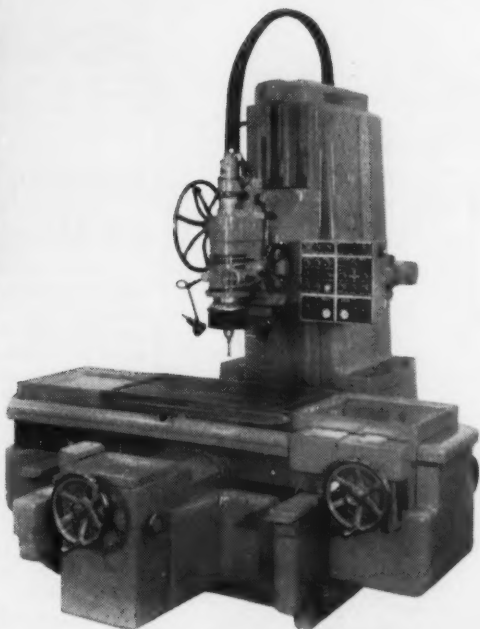
of grinding and stock removal. Long-lasting precision is assured by quality construction and by many features that provide dimensional stability, including spindle-housing heat control.

The machine may be ordered in any one of three models, one of which comes in two sizes. All will give accuracy of $\pm .0001"$.

Measuring is accomplished with measuring rods and inside micrometers or with Direct Dimension Measuring, where dimensions are simply set from blueprint to direct reading drum dials. Automatic positioning is also available.

Numerical control by punched tape or cards is available.

For a complete description of the various grinding operations, measuring systems and other machine features—many exclusive with Moore-Fosdick, write today for your jig grinder catalog.



Ask for Bulletin JG-S.

Fosted Miller Drill

Jig Borer

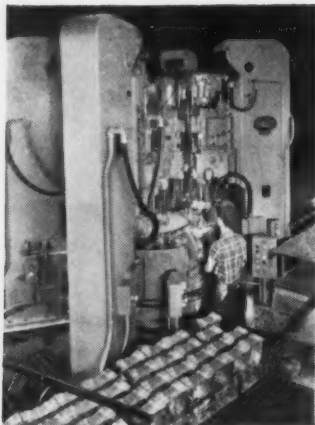
Sensitive and Straight Drill

NEED DRILLING EQUIPMENT?
GET A PROPOSAL FROM FOSDICK!

FOSDICK

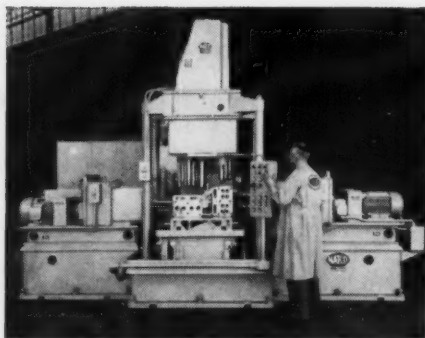
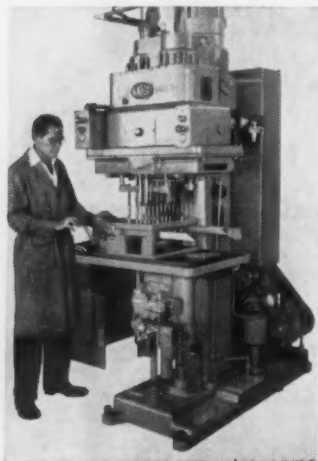
THE FOSDICK MACHINE TOOL CO.
CINCINNATI 23, OHIO

For more data circle 338 on Postpaid Card



Index Machine produces 400 cylinder blocks per hour. Operations on eleven holes include drilling, chamfering, reaming, counterboring and burrishing. Job No. BS-1.

New Multiple Spindle machine drills and taps simultaneously. Half the 16 or 24 spindles are driven electrically for drilling—the other half are driven by a hydraulic tapping motor. Suitable for production of 400 or more parts per hour or for general purpose use. Job No. 8672.



Four-way tapping machine uses 36 lead-screw spindles to process 30 diesel cylinder heads per hour. Four-position fixture holds two parts. Job No. 3719.

Somewhere in Natco's Experience is a Money-Saving Idea for You.

Only Natco builds *all six* types of production drilling equipment. As a result, we're not "married" to a particular approach. We can recommend the one that is best for you, give you the most production for your money. Tell us about your jobs. Somewhere in our experience is a money-saving idea for you! Send for our Production-Photo Folders on the jobs shown here.

Drilling, boring, facing, tapping.

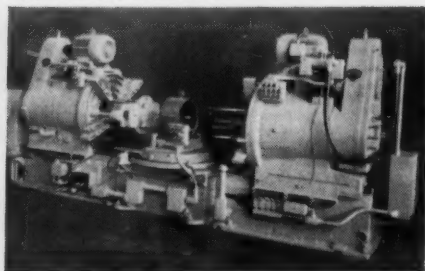
Only Natco Builds all Six

Standard multiple spindles, Way-type, Trunnion, Station, Index and Transfer Machines.



NATIONAL AUTOMATIC TOOL COMPANY, INC.
Richmond, Indiana

Two-way Natco drills and taps a variety of motor frames and brackets. Four-position index table holds either part. Left hand head drills only and is equipped for step drilling. Right hand head drills and taps. Both are adjustable for bolt circles up to 24 1/8" diameter. Job No. 3724.



For more data circle 339 on Postpaid Card

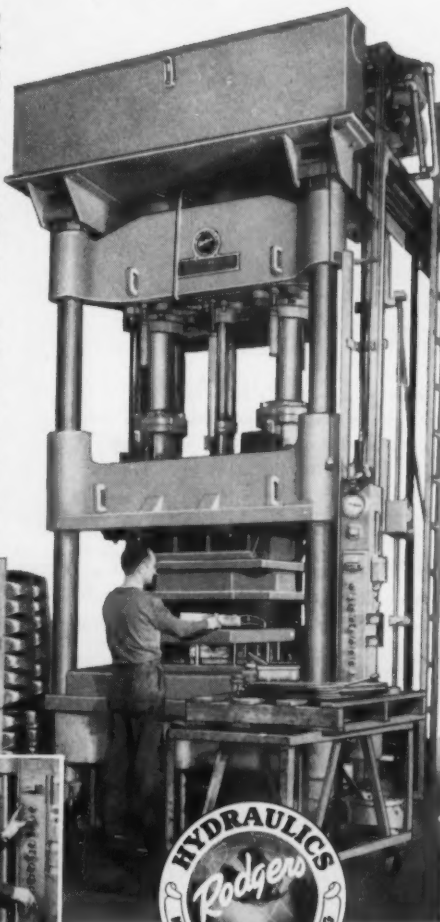
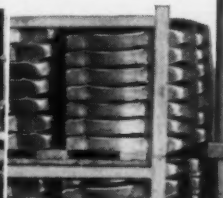
This Rodgers Platen Press Draws 800 STEEL HOUSINGS A DAY for Foley Power Mowers

Designing a light power mower to give heavy duty service and at the same time sell for an economy price takes a lot of engineering and production efficiency. The Foley TARTAN, with a cold-rolled steel housing formed on a Rodgers Platen Press, is the answer of Foley Manufacturing Co. to this problem.

The Rodgers 400-ton Platen Press handles three operations on the Foley lawn mower housings. First, it blanks the flat stock to the proper 27½" x 28¾" shape. Second, it makes the draw as shown in the photo. Third, it pierces all the holes and final trims ready for assembly.

A fast approach and return of the platen makes it possible to draw the 14 gauge cold-rolled steel blank at a production rate of 100 an hour. Working at 190 tons pressure, the machine makes a smooth draw on a pneumatic die cushion. Accurate clamping pressure over a 48" x 60" platen provides smooth, even forming and extra capacity when needed.

If you have an operation requiring a platen press, write for bulletins on Rodgers Platen Presses from 50 to 500 tons.



1 Rodgers Platen Press turns out 100 Foley lawn mower housings per hour of 14 gauge cold-rolled steel.

2 This is the Foley TARTAN, an economy 1¾ HP rotary lawn mower with a heavy duty steel housing blanked, drawn and pierced on a Rodgers 400 ton platen press.

3 Both of the operator's hands are required on controls during the drawing operation—a safety factor.

Rodgers Hydraulic Inc.

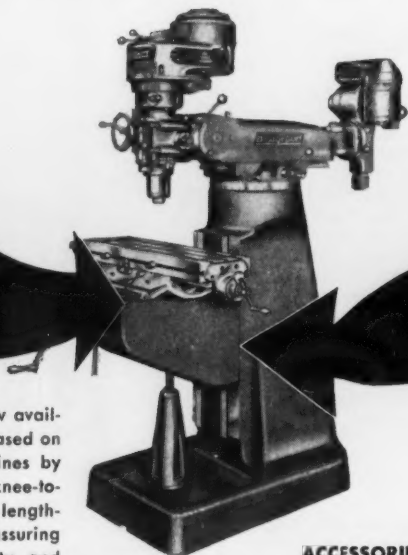
7447 Walker St., Minneapolis 26, Minn.

For more data circle 340 on Postpaid Card

Bridgeport INCREASES CAPACITY ...

CROSS
TRAVEL
from 9" to 12"

KNEE TO
COLUMN
from 15" to 18"



Through a new knee, now available, cross travel is increased on Bridgeport Milling Machines by 25%. Then, too, the knee-to-column ways have been lengthened from 15" to 18" assuring the maximum in rigidity and alignment.

Where more productivity is needed through greater capacity, these new features available in the "Bridgeport" at only a slight extra cost, will appeal strongly to shopmen everywhere. Toolmakers, moldmakers, pattern makers or production machinists will be well pleased with the greater productivity now made possible.

Ask your nearest dealer or us for further details.

ATTACHMENTS and ACCESSORIES increase versatility

Milling, Drilling and Boring Attachments: Model "J" 1 HP; Model "M" ½ HP; Model "R" ½ HP and Model "C" ¼ HP (Rigid Spindle)

Cherrying Attachment

Slotting Attachment

Power Feed

Measuring Attachment
(Rods and Indicators)

Optical Measuring System (A recent addition to the Bridgeport line)

Hydraulic Duplicators (Single Dimension and Three Dimension)

Coolant Pump

Four-Inch Raising Block

Seven-Inch Raising Block

Cross Travel Stops

Lights

Right Angle Attachments

Nos. 1, 2, 3

Shell Mill Holders Nos. 1, 2, 3

Fly Cutters, FC-3, FC-4

Threaded Arbors

Stub Arbors

End Mill Holders

Spindle Adapters

Vises No. 1 and 2

(Swivel and Plain)

Profilers for Model "J" and "M" Heads

Boring Heads Nos. 1 and 2

Collets

Chucks (Jacobs and Albrecht)

Bridgeport MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

For more data circle 341 on Postpaid Card



Lodge & Shipley POWERSHIFT PRESELECTION GIVES PRODUCTION **PLUS**

- TIME SAVING • INCREASED TOOL LIFE • FINER FINISH
- DECREASED EFFORT AND ERROR • PROVISION FOR THE FUTURE

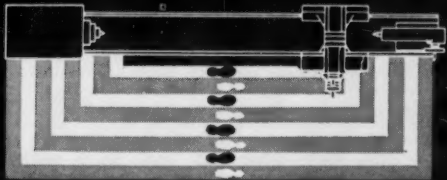
These important factors, offered by the Lodge & Shipley POWERSHIFT PRESELECTION Lathe, should be considered in selecting your new lathe.

A SINGLE DIAL... COMPUTES! REMEMBERS! SHIFTS! You merely rotate cut speed dial to desired speed (dial computes speed if desired)... then, when preset speed is needed, shift to it immediately at the apron! • One speed can be preset; up to six others "programmed" with handy indicator tabs. A Lodge & Shipley representative will be glad to explain fully. You'll find his name in the telephone yellow pages. Or, for detailed literature, write:

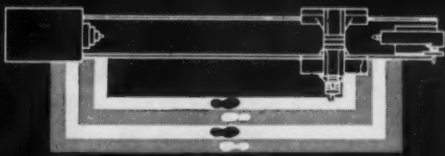
THE LODGE & SHIPLEY CO., 3058 COLERAIN AVE., CINCINNATI 25, OHIO

With a long bed lathe and a job requiring 4 speed changes, an OPERATOR CAN SAVE ALMOST 50% OF HIS "HIKING TIME"

CONVENTIONAL HEADSTOCK
4 trips to headstock ... 4 to apron



POWERSHIFT PRESELECTION
only 2 trips to headstock ... only 2 to apron!



more than ever...

Lodge & Shipley

your LODGE-ical choice

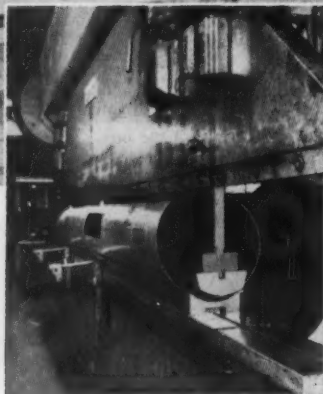
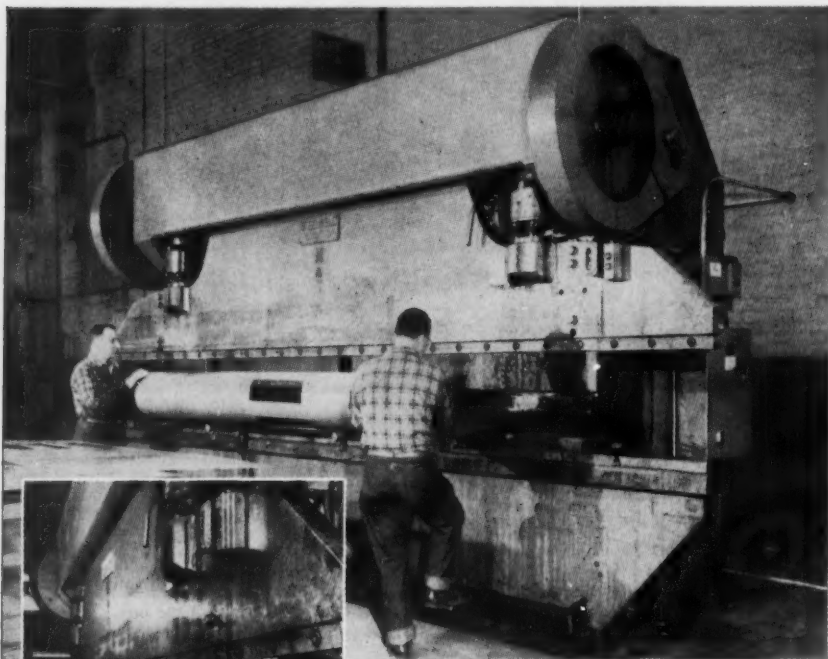


For more data circle 342 on Postpaid Card

COMBINE AUGER TUBES

25 to 50 Made Per Hour at
Massey-Harris-Ferguson, Ltd.

Steelweld Brake in service since 1950.
Bed and ram are 18'-0" long including
2'-0" extensions at both ends. Bending
capacity rated at 12' x $\frac{3}{4}$ ".



Flat metal is quickly formed into a cylinder by a series of pressure contacts with this die arrangement.

STEELWELD PRESS BRAKES

AUGER tubes for combines made at Massey-Harris-Ferguson, Ltd., Toronto, are produced at rates of 25 to 50 per hour, depending upon conditions, with a Steelweld Brake. The tubes are from 10 to 16 feet long and made of 16 gauge steel.

This job represents one of a multitude performed at low cost on this brake, which is used for many bending and metal-forming operations required for the various farm implements built by Massey-Harris-Ferguson.

Steelwelds are popular with farm machinery manufacturers and have been serving many for years. They perform accurately, keep going continuously on long production runs without need of frequent adjustments, tinkering and maintenance. They are easy and safe to operate. Dies are quickly changed.

Because Steelweld Brakes are heavily built machines loaded with features that will help you; it will be to your interest to give them serious consideration when additional brakes are needed.

Write for free copy of Catalog No. 2010
Gives construction and engineering details

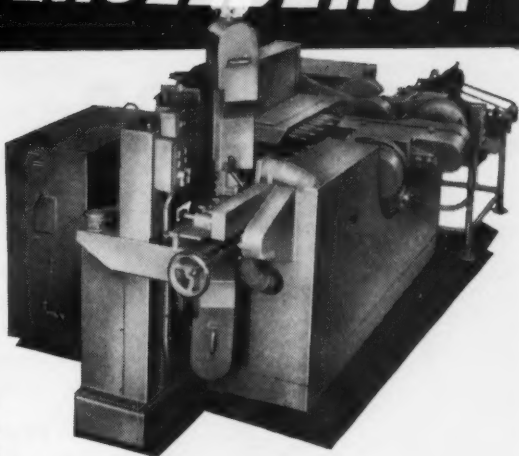
THE CLEVELAND CRANE & ENGINEERING CO. • 6468 E. 281st St. • WICKLIFFE, OHIO

For more data circle 343 on Postpaid Card

One machine "production line"

by **ENGELBERG!**

**6 SIX
OPERATIONS
IN
ONE PASS**



Designed for IBM, this Engelberg abrasive belt machine grinds four sides of a typewriter carriage rack and deburrs milled slots on opposite sides in a single pass.

Powered feed rollers automatically convey the racks past the grinding and wire brush heads at thru-feed rates from 5-to-30 feet per minute. Grinding and wire brush heads are completely adjustable for angular orientation and depth of cut.

Automatic loading and stacking devices make this part of

the production line a one-machine job, upping output and cutting costs.

• Special machines, as shown here are adaptations of standard models or custom-designed for a particular application. Let Engelberg methods - engineers study your drawings or sample for operational analysis. No cost. No obligation.



Write for Your **FREE COPY** of "How Abrasive Belt Grinding Increases Production at Lower Cost."

ENGELBERG, INC.

Precision **ABRASIVE BELT GRINDERS**

106 SENECA STREET • SYRACUSE, N. Y.

For more data circle 344 on Postpaid Card

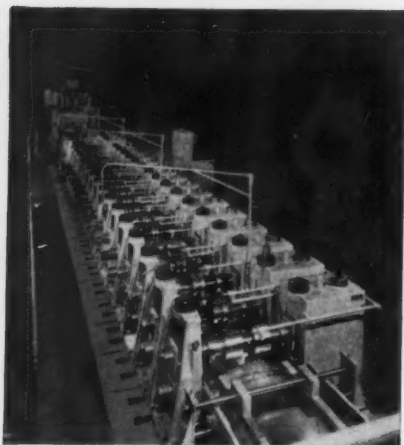
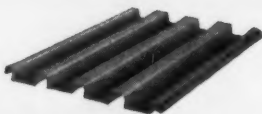
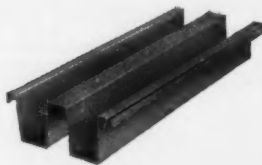
June, 1958

modern machine shop 43

Steel Roof Decks and Flooring
cold rolled up to 200 f.p.m.
on this mammoth

ARDCOR

ROLL FORMING MACHINE



ARDCOR Roll Forming Machines feature: Unit Design—spindles in self-contained SEPARATE HOUSINGS, with speed reducers; Large Range of Vertical Centers; Double Bearing Design of Drive Housings; All Bearings are Anti-Friction; Micrometer Type Dials and Scales.

This entire automated production line is 15 ft. wide, 6 ft. high and 120 ft. long with total equipment weighing approximately 175 tons. Mill stands are completely movable, having $4\frac{1}{2}$ in. dia. spindles with 42 in. roll space.

Fed by 20,000 lb. steel coils, the twenty-two roll passes form the $1\frac{1}{2}$ in. deep by 2 ft. wide sections. The mill operator controls the loading, lining-up and feeding of the coil stock from a control bridge at entry of the mill. A 150 ton Straight Sided ARDCOR Press cuts off sections to proper lengths.

ARDCOR Roll Forming Machines are available in six standard sizes, other sizes to customer specifications.

If your products can be cold roll formed, ARDCOR engineers can supply advancements in design and construction to produce them better . . . at greater speeds and profit

Consult our Engineering Facilities without obligation . . .



American ROLLER DIE CORP.
29590 Clayton Avenue -- Wickliffe, Ohio

DESIGNERS AND MANUFACTURERS: All Sizes and Spindle Diameters of Roll Forming Machines, Welded and Lock Seam-Tube Mills • Forming Walls, Tubing and Pipe Rolls • Straightening, Pinch and Leveller Rolls • Cut-off Machines

For more data circle 345 on Postpaid Card

**everything you need
to fasten
anything with screws**

APEX

SCREWDRIVING TOOLS

- IF** you drive thousands of screws every day, or just a few—
- IF** you use one size or several sizes of screws—
- IF** you use Phillips, slotted, socket head or any other kind of screws—
- IF** you work with case-hardened, sheet metal, heat treated, wood or any other type of screws—
- IF** you use manual or power tools, or even multiple units to drive screws—
- THEN** you can use, to good advantage, Apex screwdriving tools designed especially for your type of screwdriving work. For most applications, just choose the correct Apex tools from the most complete line ever offered. For special applications, just ask Apex—the authority on fastening—for practical assistance in solving your problem.
- Write, on your company letterhead please, for Catalog 21—Apex Screwdriving Tools, or Catalog 25—Magnetic Fastening Tools.

APEX BUILDS
TOOLS TO DRIVE
ALL THESE TYPES
OF SCREWS:



PHILLIPS



FREARSON
(Reed & Prince)



SLOTTED



CLUTCH HEAD



SOCKET HEAD



SPLINE
(Bristol)



SLAB



ROBERTSON
& LINREAD

1933

A Quarter Century of Service to Industry

1958

THE
APEX

MACHINE & TOOL CO.

1027 S. Patterson Blvd.
Dayton 1, Ohio

TOOLS FOR
screwdriving
nut running

FASTENING

For more data circle 346 on Postpaid Card

June, 1958

modern machine shop 45



OLIVER TEMPLATE TOOL BIT GRINDER

Precision Duplication

in **ONE** operation

That's right! The Oliver Template Tool Bit Grinder sharpens single point tungsten carbide, high speed and stellite turning tools . . . duplicating exactly all original flats and radii every time the tool is ground . . . in one simple, efficient grinding operation.

How is it done? Well, as you can see from the drawing above the answer lies in "template control." The template at the top of the specially designed

tool holder is a twice size replica of the tool being ground. The tool, securely held at mid-point in the holder, contacts the wheel and is ground until the template touches the template stop. In this manner, the tool is ground to the exact profile of the template. The entire operation is performed in seconds, easily, accurately on one machine . . . a machine that pays for itself by reducing your tool inventory and eliminating lost production time and tool breakage.

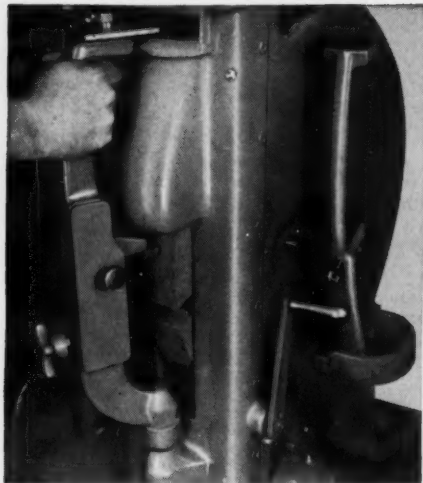
For more data circle 347 on Postpaid Card

The
grind
20° c
The
grind
surf
tung
featu
easil
fram
with
lever

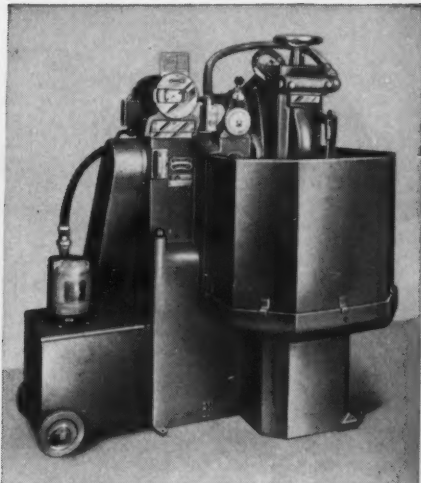
Just
ADRI

O
OL

143



The Oliver Template Tool Bit Grinder has a 20" wheel that grinds turning tools up to 1½" wide by 1¾" high, from 0° to 20° clearance . . . and to any predetermined contour or angle. The unit is self-contained in that it performs the complete grinding operation as well as template production. All working surfaces are hardened and ground steel and surfaced with tungsten-carbide where necessary to assure long life. A unique feature of the unit is the tool holder which permits an even, easily controlled tool pressure against the wheel. It's an iron frame—supported at its lower end by a ball and socket joint with a template at the upper end giving the operator a 2 to 1 leverage.



Outstanding among the Oliver Tool Bit Grinders' many advantages is ease of operation. Positive "template control" assures duplication of the tool shape in relation to the shank making all tools of a kind exactly alike. A clearance setting gauge determines the correct amount of metal to be removed. A plentiful supply of water, both through the wheel and on the tool, insures against overheating. The Oliver 20" Template Grinder will remove metal . . . both high speed and tungsten-carbide . . . at a speed unmatched by any other single point tool bit grinder currently on the market.

More OLIVER of ADRIAN Tool Grinding Equipment



ACE TOOL and CUTTER GRINDER

Universal—grinds milling cutters, other cutting tools. Especially suited to grinding tungsten carbide.



DIE MAKING MACHINE

Produces dies, gages, cams, templates, strip-plates, etc. at greatly reduced costs. 5 designs in 2 types.



FACE MILL GRINDER

Completely automatic. A machine tool designed for accurate grinding. Wheel dressed with every stroke.



No. 510 DRILL POINTER

Semi-automatic. For drills ¼" to 3" in diameter. No. 51 bench models available for size ½" and smaller.



DRILL POINT THINNER

For low cost reclaiming of drills. Corrects off-center and too-thick webs and out-of-index cutting edges.

Just check the coupon for literature on the OLIVER of ADRIAN machine you are interested in. Send it today to . . .



OLIVER of ADRIAN

OLIVER INSTRUMENT COMPANY

1430 E. Maumee St. • Adrian, Michigan

- | | |
|--|--|
| <input type="checkbox"/> Drill Pointer | <input type="checkbox"/> Die Making Machine |
| <input type="checkbox"/> Face Mill Grinder | <input type="checkbox"/> Drill Point Thinner |
| <input type="checkbox"/> "Ace" Universal Tool and Cutter Grinder | <input type="checkbox"/> Template Tool Bit Grinder |
| <input type="checkbox"/> Literature only | <input type="checkbox"/> Quotation requested |

NAME _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____



Balance Adds Cutting Life

An almost perfect balance of *toughness, wear resistance and red hardness* gives duMONT Tool Bits a definite edge in cutting life, gives you more cuts per bit, more cuts per dollar.

duMONT TOOL BITS

High Speed, Ground Square and Rectangular

MAIL TODAY - SAVE TOMORROW

The du MONT CORPORATION, Greenfield, Mass.

MAIL FREE Tool Bit COMPARISON CHART, CATALOG and PRICE LIST S.

Name.....

Company.....

Address.....

For more data circle 349 on Postpaid Card

42 modern machine shop

Meetings

Important Meeting

Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

JUNE 2-4 • National Fluid Power Association, Annual Meeting, Bedford Springs Hotel, Bedford, Pa. Association headquarters: 1618 Orrington Ave., Evanston, Illinois.

JUNE 8-13 • Society of Automotive Engineers, Summer Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Society headquarters: 485 Lexington Ave., New York 17, New York.

JUNE 9-10 • Malleable Founders' Society, Annual Meeting, Homestead, Hot Springs, Va. Society headquarters: 1800 Union Commerce Bldg., Cleveland 14, Ohio.

JUNE 9-12 • National Materials Handling Exposition and Conference, Public Auditorium, Cleveland. Information: Clapp & Poliak, Inc., 341 Madison Ave., New York 17, New York.

JUNE 9-13 • International Automation Congress and Exposition, Coliseum, New York. Information: Richard Rimbach Associates, Inc., 845 Ridge Ave., Pittsburgh 12, Pennsylvania.

JUNE 15-19 • American Society of Mechanical Engineers, Semi-Annual Meeting, Statler Hotel, Detroit. Society headquarters: 29 W. 39th St., New York 18, New York.

JUNE 21-24 • Alloy Casting Institute, Annual Meeting, Homestead, Hot Springs, Va. Institute headquarters: 286 Old Country Rd., Mineola, New York.

JUNE 22-27 • American Society for Testing Materials, Annual Meeting and Exhibit, Statler Hotel, Boston. Society headquarters: 1916 Race St., Philadelphia 3, Pennsylvania.

JUNE 23-27 • American Institute of Electrical Engineers, Summer General Meeting, Hotel Statler, Buffalo. Institute headquarters: 33 W. 39th St., New York 18, New York.

June, 1958

ANOTHER CUSHMAN CHUCK AT WORK!

Hold it right and machine it faster with
CUSHMAN manually operated chucks,
air operated chucks and cylinders,
power wrench chucks and power wrenches,
pinch jaw chucks—hand and automatically operated,
boring mill and face plate jaws.

CUSHMAN

Hartford 2 Conn.

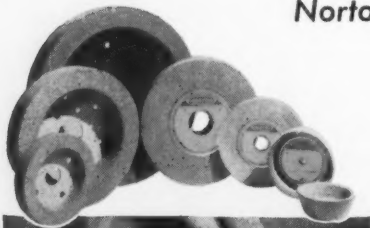
Sold through
your industrial
distributor.

CUSHMAN CHUCKS,
a product of American quality,
labor and materials.

Fishing for



Norton K† Bond CRYSTOLON* Wheels Bring Big Advantages to Offhand Grinding



Here's a combination of vitrified bond and silicon carbide abrasive that delivers remarkable results — particularly in offhand sharpening of single-point carbide tools. Wheels are made in dense, medium, or porous structure — for most efficient action regardless of the area of contact.

Also, CRYSTOLON abrasive is available in green or gray types — green, 39C, being first choice in a majority of carbide applications. And the Norton K Bond is one of the most radically improved vitrified bonds ever developed. One big advantage is: *it assures closest possible duplication of wheel specifications.* Which means that every time you re-order K Bond wheels you get exactly the same top performance.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries
†Patent applied for

Thin or carbide grinding economies?

Catch 'em all fast— with the finest lures made

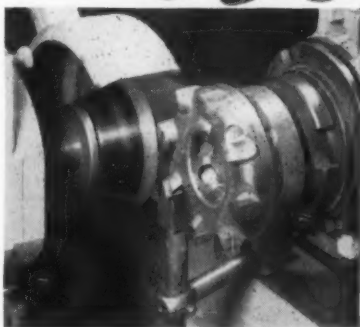
You cut grinding costs to rock bottom with Norton's
outstanding wheel selection and service

Norton Diamond Wheels, Mined or Man-Made ...Carbide Grinding's Certified Crown Jewels

Norton was first to introduce all three bond types of diamond wheels: resinoid, vitrified and metal . . . does all its own checking and sizing of diamonds . . . duplicates wheel specifications with constant accuracy.

The three Norton bonds — resinoid, vitrified and metal — cover the complete range of carbide grinding requirements — from roughing to precision — including sharpening, surfacing and cutting off — on all kinds of work: single-point tools, multi-tooth cutters, form tools, dies, blanks, etc. Resinoid wheels are available in special bond types — B for wet and B6 for dry grinding.

Norton leadership in diamond wheel manufacture continues whether the diamonds used are natural or man-made. And with each Norton diamond wheel you get a certificate of diamond concentration, bearing the signature of the President of this Company.



W-1844

The Complete Line, Completely Serviced

See your Norton Abrasive Engineer or Distributor for expert advice and prompt deliveries on the wheels you need for top quality, lowest cost carbide grinding. Or write to NORTON COMPANY, General Offices, Worcester 6, Massachusetts.

NORTON
ABRASIVES

*Making better products...
to make your products better*

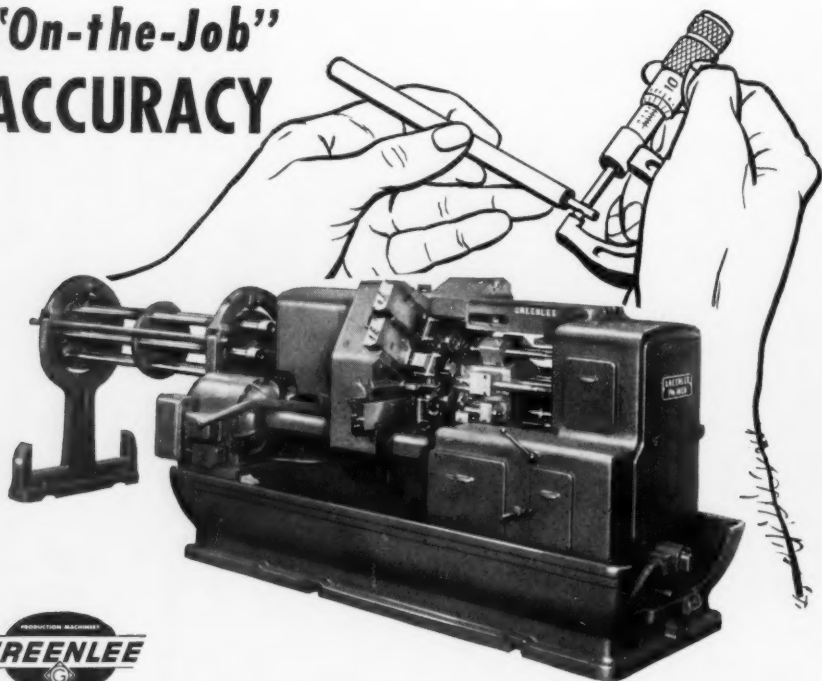
NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals
BEHR-MANNING DIVISION Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

For more data circle 352 on Postpaid Card

June, 1958

modern machine shop 51

"On-the-Job"
ACCURACY



AUTOMATIC BAR MACHINES

Greater Dependability . . . Faster Production



Modern production demands greater accuracy . . . at greater speeds. Greenlee Automatic Bar Machines maintain rigid production schedules and hold each piece within required tolerances. Let Greenlee engineers show you how Greenlee Automatics save time and money. It will pay you to investigate.

Write today for Catalog A-405, first step on the way to more profitable production with Greenlee Automatic Bar Machines.



GREENLEE BROS. & CO.
1886 Mason Avenue
Rockford, Illinois

For more data circle 353 on Postpaid Card



*Illustrated—New 9700 Series
Piggy Back Hydraulic Control Valve
Meets J.I.C. Standards*

Look to Logan

the ultimate in hydraulic valve design



FREE SEND FOR THE "LOGAN CALCULATOR"

MEMBER: Natl. Mach. Tool Builders'
Assn.; Natl. Fluid Power Assn.

**LOGANSPOUR MACHINE CO., INC.
801 CENTER AVENUE, LOGANSPOUR, INDIANA**

PLEASE SEND COPY OF CATALOG:

- | | |
|--|--|
| <input type="checkbox"/> 100-1 AIR CYLINDERS | <input type="checkbox"/> 200-1 HYD. POWER UNITS |
| <input type="checkbox"/> 100-2 MILL-TYPE AIR CYLS. | <input type="checkbox"/> 200-2 ROTOCAST HYD. CYLINDERS |
| <input type="checkbox"/> 100-3 AIR-DRAULIC CYLS. | <input type="checkbox"/> 200-3 750 SERIES HYD. CYLINDERS |
| <input type="checkbox"/> 100-4 AIR VALVES | <input type="checkbox"/> 200-4 AND 200-7 HYD. VALVES |
| <input type="checkbox"/> 100-5 LOGANSQUARE CYLINDERS | <input type="checkbox"/> 200-6 SUPER-MATIC CYLS. |
| <input type="checkbox"/> 100-6 ULTRAMATION CYLINDERS | <input type="checkbox"/> 300-1 CHUCKS |
| <input type="checkbox"/> 300-2 PRESSES | <input type="checkbox"/> ABC BOOKLET |
| <input type="checkbox"/> FACTS OF LIFE | <input type="checkbox"/> CIRCUIT RIDER |

TO:

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

For more data circle 354 on Postpaid Card

June, 1958

modern machine shop 53

Put Yourself in Position to
MEET TODAY'S COMPETITION
AND
INCREASE YOUR SALES

Bring your Assembly and Machining
Methods Up-to-Date and Cut Costs

with **DPS** POWER
METHODS

... the Key to
**PRODUCTION
ECONOMY—**

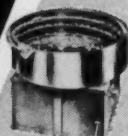


that will mean more
SALES ACTIVITY and
protection to your
PROFITS through
ability to meet
the price
resistance
that exists

Today!



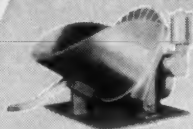
SCREW, NUT
AND
STUD-DRIVING
MACHINES



VIBRATORY
PARTS FEEDERS



ROTARY
BARREL TYPE
SELECTIVE FEEDERS



HIGH CAPACITY
HEAVY-DUTY FEEDERS

**Why waste money waiting? Act now! Phone
or write today. Get our literature. Send parts
and prints if possible for engineering study**

DETROIT POWER SCREWDRIVER CO.

2807 W. FORT STREET • DETROIT 16, MICHIGAN

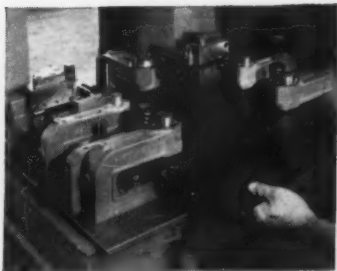
For more data circle 355 on Postpaid Card

54 modern machine shop

June, 1958

Strippit Punching and Notching Units are easily mounted to templates, T-slotted plates or rails in unlimited patterns for long press runs or quick-change pilot runs. Complete range of standard tools, or "specials" made up on request.

Warehouse stocks in Chicago and Los Angeles.



STRIPPIT multiple punching and notching

The above cutaway of a Strippit Punching Unit illustrates the extreme flexibility and economy of Strippit punching of flats, structurals and extrusions up to $\frac{3}{4}$ " mild steel.

Note that each unit is complete with punch, die button, stripping guide, guide button, lifter assembly and retainers — all quickly interchangeable in a husky holder and actuated by the press ram. Multiple punching — and notching — press setups are easily bench-assembled on drilled mounting templates, with each unit accurately located by the pilot pin in its base. Press down-time is almost negligible in setups of Strippit Punching Units, Notching Units, Punch and Die Assemblies or combinations of all three.

Write today for full details and if you wish, a demonstration on your work at your plant by a Strippit mobile unit.

WALES

STRIPPIT COMPANY

207 Buell Road, Akron, New York

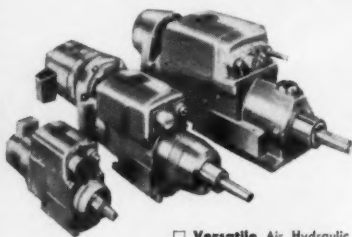


Manufactured in Canada by Strippit Tool and Machine Limited, Brampton, Ontario
For more data circle 356 on Postpaid Card

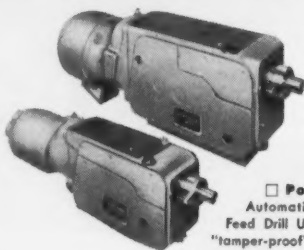
June, 1958

modern machine shop 55

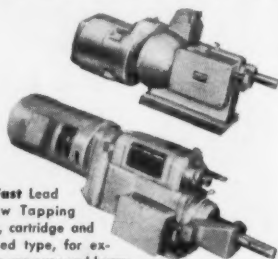
**YOU
CAN CUT
PRODUCT COSTS
WITH HARTFORD
POWER UNITS**



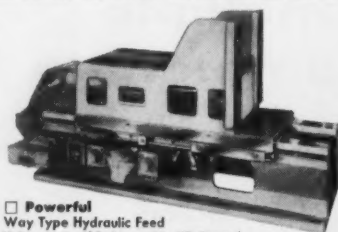
☐ **Versatile** Air Hydraulic Drill Units for quick change of set-ups, rapid operation.



☐ **Positive** Automatic Cam Feed Drill Units for "tamper-proof" accuracy on long runs, faster cycling, lower cost per piece.



☐ **Fast Lead** Screw Tapping Units, cartridge and geared type, for extreme accuracy and heavy duty multiple spindle work.



☐ **Powerful** Way Type Hydraulic Feed Units up to 30 h.p. with "Balanced Thrust", rigid accuracy, quick traverse, long travel on hardened ways for high production, multiple spindle work.



Remember, too, you can keep your tooling cost low by using Hartford "off-the-shelf" machine components — bases, columns and adapters.

☒ Check the type that will reduce **your** manufacturing costs. Write today for full information and name of our nearest field man — a specialist in low cost production techniques.

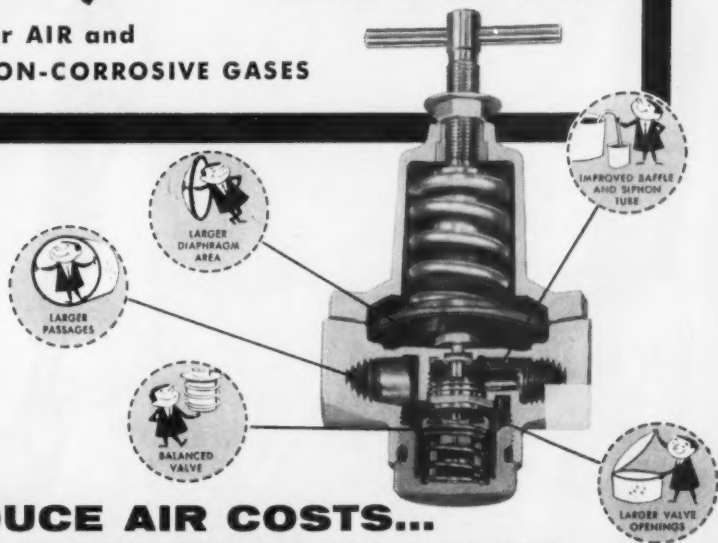
THE HARTFORD SPECIAL MACHINERY COMPANY
MACHINE TOOL DIVISION
2756 HOMESTEAD AVENUE, HARTFORD 13, CONN.

For more data circle 357 on Postpaid Card



Norgren PRESSURE REGULATORS

For AIR and
NON-CORROSIVE GASES



REDUCE AIR COSTS... CUT MAINTENANCE COSTS

Norgren Pressure Regulators reduce line pressures to the desired working pressure, produce better equipment performance and longer life, lower maintenance and compressed air costs because of the following features:

Highly Accurate over a wide operating range.

Regulated Pressure Held Constant even with widely fluctuating line pressure and rapidly varying air flow.

Large Flow Capacity—a. Balanced valve construction; b. Large effective diaphragm area; c. Improved baffle and siphon performance; d. Large passages; e. Large valve openings.

Also regulators for water, oil, other liquids and steam.



If it's Norgren... It's Dependable.

For complete information, call
the Norgren Representative
listed in your telephone
directory—or
WRITE FOR No. 900 CATALOG.

C. A. NORGREN CO.

3435 SOUTH ELATI STREET • ENGLEWOOD, COLORADO

For more data circle 358 on Postpaid Card

June, 1958

modern machine shop 57



NEW... RIGHT ANGLE Dial Bore Gages for "Hard-to-Get-at" Openings

THIS new type dial bore gage by *STANDARD* speeds gaging where space is limited. Designed for use on work in jig borers, internal grinders and horizontal boring mills without disturbing machine set-up or need for excessive backing off. Also for parts inspection where space is restricted.

Gage head and dial unit can be turned in any direction, adding to the convenience and safety

features which make this new gage a real "knuckle saver" by keeping hands away from sharp tools and turning wheels.

A set for economical tool room and job shop use consists of a single dial unit with two interchangeable heads covering a range from $\frac{3}{8}$ " to 1". Individual gages in six sizes cover a range from $\frac{3}{8}$ " to $6\frac{1}{8}$ ". Ask the *Man from Standard* for demonstration.

Write for Product Bulletin 58-1



® SINCE 1925

GAGE COMPANY, INC.

POUGHKEEPSIE, N.Y.

A COMPLETE LINE OF GAGES . . . INDICATING, FIXED AND ADJUSTABLE TYPES

For more data circle 360 on Postpaid Card

NOW'S THE TIME... HERE'S THE PLACE to find the tumbling abrasive you need

The big Norton Sample Processing Department solves your finishing problems with a wide variety of latest types of tumbling equipment — plus Norton ALUNDUM® TUMBLEX® abrasives, made in four different types and many different sizes.



One leading aircraft parts manufacturing company reports saving over \$90,000 yearly by shifting from hand-finishing to barrel finishing with Norton TUMBLEX abrasives.

There's one sure way for you, too, to get these cost-cutting, product-improving "Touch of Gold" advantages. Your metal parts can range from tiny needles to hefty forgings . . . may be simple or complicated, hard metals or soft . . . may require deburring, de-

scaling, better color and closer finish. Just send sample parts to our Sample Processing Department. They'll be returned to you completely finished to requirements, with a detailed report. Or, next time you're in our area, drop in and learn how your finishing can be improved.

NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors all around the world.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

G-342



ABRASIVES

*Making better products...
to make your products better*

NORTON PRODUCTS

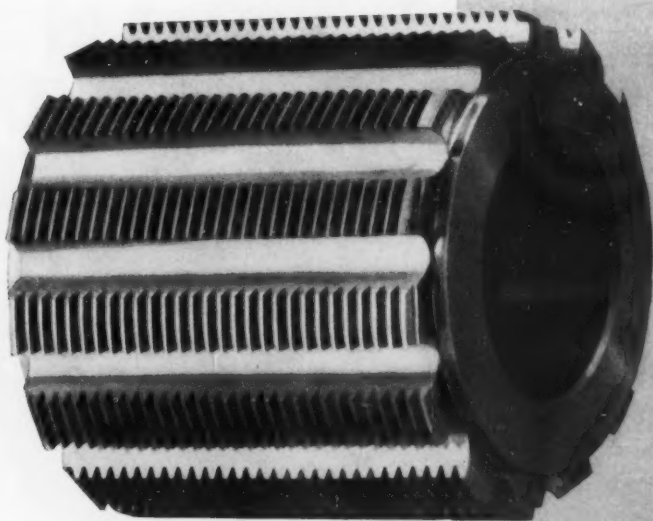
Abrasives • Grinding Wheels
Grinding Machines • Refractories

BEHR-MANNING DIVISION

Coated Abrasives • Sharpening Stones
Pressure-Sensitive Tapes

For more data circle 361 on Postpaid Card

ADVANCE IN ACCURACY



Hanson-Whitney's refined accuracy standards for fine pitch ground thread gear hobs meet the most exacting demands of this highly specialized field.

A good example is outstanding *lead accuracy* . . . made possible by the exclusive H-W Process. This enables the operator, once the machine is set, to use the *entire* width of the gear hob *without resetting* . . . eliminates trial and error methods. And highest quality materials and heat treating insures maximum pieces per grind — more performance in dollar value.

Hanson-Whitney offers practical engineering assistance on all threading problems . . . provides a unified, **one source** supply for machine tools, cutting tools and precision gages.

And you can always count on Hanson-Whitney Distributors across the country for fast service from complete stocks.

Write for catalogs.

Hanson-Whitney

COMPANY

Division of Whitney Chain Company

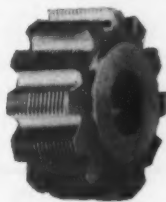
204A BARTHOLOMEW AVE. • HARTFORD 2, CONN.

TAPS • THREAD GAGES • HOBS • CENTERING MACHINES • THREAD MILLING MACHINES AND CUTTERS

For more data circle 362 on Postpaid Card

June, 1958

modern machine shop 61



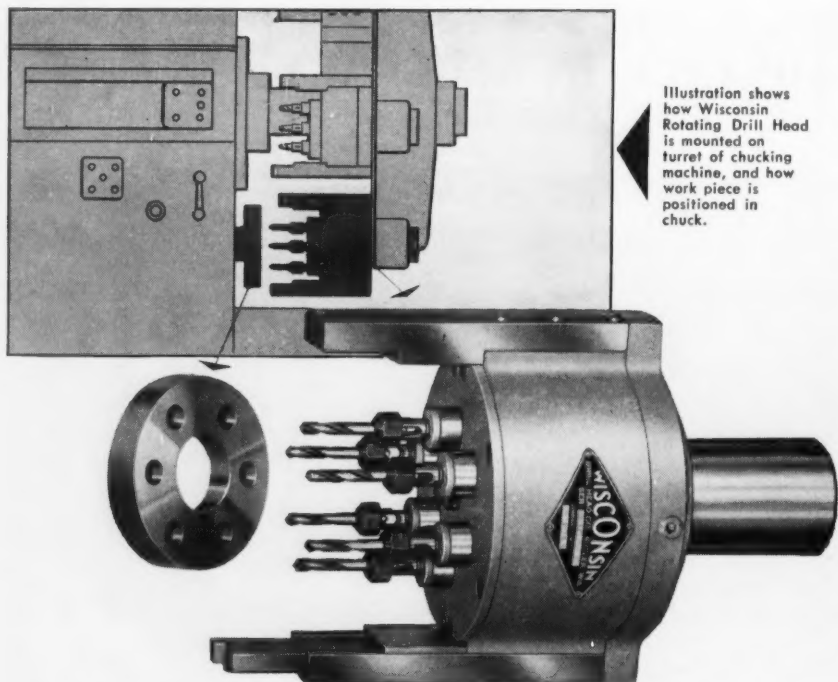


Illustration shows how Wisconsin Rotating Drill Head is mounted on turret of chucking machine, and how work piece is positioned in chuck.

WISCONSIN Rotating Heads for your Automatic Chucking Machines

Rotating Drill Heads and Tapping Heads by Wisconsin are winning wide favor because of their efficient performance on popular makes of automatic chucking machines and lathes. If you have a drilling or tapping operation to perform at low cost, consider the application of one or more of these heads specially engineered to your specifications. The Wisconsin engineering staff is qualified by training and experience to assist you in tooling for high speed, low-cost production. Send your "specs" and prints for quotation.

CONSULT OUR FIELD ENGINEERS OR WRITE —



WISCONSIN DRILL HEAD CO.

4983 NORTH 124TH STREET • BUTLER, WISCONSIN

For more data circle 363 on Postpaid Card

A8-9447-1/2I

June, 1958

STILL ANOTHER LODDING FIRST!



Lodding, Inc. announces a completely automatic clamp (patent pending). This new Lodding production meets the need of the metalworking industry for a compact, automatic and heavy-duty clamp. Air operated and cam locked to hold clamp locked in any event of air failure. Note the compactness (the air cylinder is under the clamp). Delivers ten times line pressure. All wearing parts heat treated. Overall dimensions are 3" wide, 3 $\frac{5}{8}$ " high and 8 $\frac{1}{4}$ " long.

LODDING, INC. WORCESTER 1, MASS.

Goodwin-Snader Co.
6814 S. Western Ave.
Los Angeles 47, Calif.

← FACTORY WAREHOUSES →

Bagby Engineering Co.
1047 Forest Ave.
Evanston, Ill.

For more data circle 364 on Postpaid Card



Spark your way to easier, faster dressing with a NORBIDE Dressing Stick

With a NORBIDE Dressing Stick you can see more of the wheel for easier, faster dressing.

The stick causes the wheel to throw out sparks, light up your work. Reduced dressing dust keeps air clear. And the stick's convenient size doesn't obstruct your view. You see the wheel better — avoid costly overdressing.

NORBIDE Dressing Sticks outlast hundreds of ordinary sticks. Made of boron carbide, they approach diamonds in hardness — at a fraction of diamond cost.

Order one today or write for form 1567 giving more details.

NORTON COMPANY, 49 New Bond St., Worcester 6, Massachusetts.



W-1864

Making better products . . . to make your products better
For more data circle 365 on Postpaid Card

making big "CATS" purr

WITH

LEHMANN-FULTON

**BORING
TOOLS**



Photo Courtesy
Caterpillar Tractor Co.

Like so many other manufacturers of precision products, Caterpillar Tractor Co. of Peoria, Ill., uses Lehmann-Fulton Boring Bars.

Above you see the bars boring a block for cylinder liners used in their D386 and D397 diesel engines. Lehmann-Fulton bars rough and finish bore for a close tolerance fit of the liners.

Whether your boring operation is routine or special, call on Lehmann-Fulton's 38 years of industry-proved engineering and designing skill.

Specify Lehmann-Fulton Boring Tools to help cut your machinery time to a minimum and to stop costly errors in tool setting.

SEND FOR YOUR FREE CATALOG TODAY...NO OBLIGATION, OF COURSE



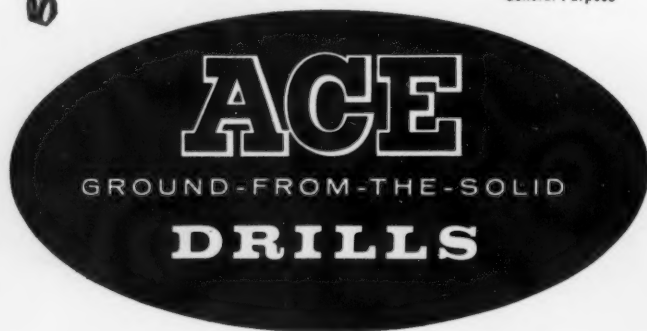
LEHMANN BORING TOOL

DIVISION OF FULTON IRON WORKS COMPANY
4235 DUNCAN AVE. • ST. LOUIS 10, MO.

For more data circle 366 on Postpaid Card



**Pick the drill that's
right for your job!**

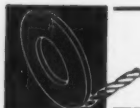


12" Longboy

18" Longboy

Right you are when you specify Ace Ground-from-the-Solid Drills! Chances are you'll find the expanded Ace line includes standard stock drills that are tailor-made for your job. Long ones, short ones. Big ones, small ones. Drills made of top quality, uniformly hardened high speed steel. Carbide tipped and solid carbide drills, too. What's more, you'll find that every Ace drill is *pointed right* for you . . . finished with highly polished flutes and stronger, keener cutting edges that resist wear and breakage, stay on the job longer. So be right, buy right . . . specify "Ace".

Call your local distributor
or write direct today for the
latest Ace Drill Catalog and
current Net Price Schedule.



ACE DRILL

ADRIAN, MICHIGAN

Originators of Ground-from-the-Solid High Speed Steel Drills

For more data circle 367 on Postpaid Card

BREAK THE "PROFIT SQUEEZE" WITH BRIGHTBOY

Improve Your Product at Lower Cost

The unique working action of multi-use Brightboy (*abrasive and rubber, functioning simultaneously*) produces a finish that frequently constitutes the final polish.

Brightboy is a STOCK line, made in a wide range of Silicon Carbide and Aluminum Oxide grains. Each in grades from extra fine to extra coarse, in soft, firm and tough rubber binders. The compound is in the rubber. *No muss! No fuss!*

Brightboy numbers are JOB-MATCHED to your finishing requirements; often take the place of "special" compounds; prove their versatility on regular and special finishing. A Brightboy finish frequently

constitutes the final polish, without necessitating an extra operation.

Made in WHEELS, STICKS, RODS & BLOCKS for machine and manual applications. Ask your dealer to recommend the Brightboy numbers for your needs, and for the Brightboy catalog listing applications and machine speeds. Write for "Notes From The Brightboy Service Engineer," describing Brightboy applications and uses.

Write for FREE SAMPLE
BRIGHTBOY HAND PIECE
for quick-job cleaning.



BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.
95 North 13th Street • Newark 7, N. J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives



For more data circle 368 on Postpaid Card



New Lamina Wear Plates Last Longer, Cost Less!

Now . . . save money and get better performance wherever you have sliding contact between flat metal parts! The principle of bronze electroplated on a steel backing originated with Lamina Bronze-Plated Guide Pin Bushings. Proven during countless millions of punch press hits, it is now being used successfully to produce flat wear plates.

This new concept in wear plate design combines the low cost, ready machinability and solid backing of steel with the long-wearing, non-seizing, free-running properties of a copper-tin bronze alloy. Lamina Bronze-Plated Wear Plates are flat, parallel, and can be easily machined to suit your application. Standard sizes available from stock. End costly wear problems and reduce expensive downtime now! Write for complete information.

Lamina
DIES AND TOOLS, INC.
P.O. BOX 31, ROYAL OAK, MICHIGAN

MANUFACTURERS OF LAMINA GUIDE PINS,
BRONZE-PLATED BUSHINGS, PROGRESSIVE
AND LAMINATION DIES

For more data circle 369 on Postpaid Card

and now . . . Abrasive "operator engineering" brings you —

AUTOMATIC CYCLING ON SURFACE GRINDERS

Grind precision work to size — *automatically* — like this: Simply set this

down-feed increment



from .0001" to .0025". Then, the head automatically

down-feeds that amount each time these adjustable trips



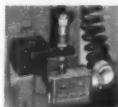
reverse the saddle, or

if you wish, each time this table control

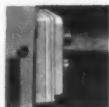


reverses the table. When this

micrometer stop, which you have set to finish size, contacts this micro switch,



the down-feed knocks off and this red light



flashes on. Then, depending upon

how you have set this control,



the grinder will automatically spark out

1, 2 or 3 times. Abrasive's cost-cutting automatic cycling is available on all Hydrabrasive

precision surface grinders



which are illustrated and described in this colorful

brochure.



Write for it, now!

ABRASIVE MACHINE TOOL COMPANY

East Providence, Rhode Island.

For more data circle 370 on Postpaid Card

June, 1958

modern machine shop 68a



form INTERNA THREADS

BESLY

X-PRESS TAPS

- Eliminate tap breakage due to chips
- No chip interference permits tapping to bottom of blind holes
- Recommended speeds higher than for conventional tapping
- No flutes—stronger taps
- Stronger threads by compacting metal
- Drill breakage reduced especially in smaller sizes, because larger tap-drills used
- Reduce cost per tapped hole wherever successfully applied
- No cutting edges to wear down

TESTED...PROVED

Aluminum Screw Machine Part—

Company gained 27,000 threaded holes per X-Press Tap vs 800 per conventional tap previously. Cycling time reduced from 6.4 to 3.6 seconds.

Zinc Die Cast Part—

Maker now gets 20,000 to 25,000 threaded holes with X-Press Taps, opposed to only 1000 before. Tap breakage due to chips was also eliminated.

Seamed Copper Telephone Part—

10,000 average threaded holes per X-Press Tap now achieved by this producer vs less than 200 by former method with conventional taps.

½ Hard Brass Screw Machine Part—

Phenomenal results by this user—300,000 pieces per X-Press Tap, 250 previously. Excessive conventional tap breakage caused low rate before.

Names and Data Furnished on Request

BESLY HAS A COMPLETE TAP LINE FOR EVERY JOB



Straight Pipe Taps



Taper Pipe Taps



Standard Hand Taps



Standard Machine Screw Taps



Spiral Point Machine Screw Taps



Spiral Point Hand Taps



Fluteless Spiral Pointed Taps



4 FLUTE
STRATE-FACE
TAP



NEW "STRATE-FACE"
TAP FOR CAST IRON
ONLY—Freer cutting,
more accurate tapped
hole sizes, longer tap
life, less tap breakage.



REGULAR
4 FLUTES

STANDARDS—immediate delivery. MODIFIED STANDARDS and "SPECIALS"—fast

Without cutting

New Revolutionary Tapping Principle Cold Forms Internal Threads In . . .

- COPPER
- ALUMINUM
- BRASS
- LEAD
- ZINC
- DIE CASTINGS
- LEADED STEELS
- OTHER DUCTILE METALS

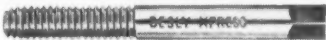
ESLY X-Press Tapping is a cold forming or forging process for producing internal threads in ductile metals. The desired thread is formed under pressure. The grain fibers follow the contour of the thread, as in good forgings. They are not cut away as in conventional tapping methods. Complete application details are available — see your Besly distributor, or send coupon. *Where this new tool can be successfully applied the results are phenomenal! It would pay you to try it yourself — NOW!*



"SR" Style X-Press Taps



"P" Style X-Press Taps



"B" Style X-Press Taps



"PC" Style X-Press Taps

SEE YOUR BESLY DISTRIBUTOR or send coupon

Engineering, Service and Specials . . . are a Besly Specialty

BESLY

**BESLY-WELLES
CORPORATION**

Est. as C. H. Besly & Co. 1875

108 Dearborn Ave., South Beloit, Ill.

Tools and Abrasives • Taps • X-Press Taps • Drills •
End Mills • Tool Bits • Gages • Carbide Tipped
Tools, Blanks, Lapped Toss-away Inserts and Holders

CLIP TO YOUR LETTERHEAD

- Send X-Press Tap data ☐
Send Drill Catalog ☐
Carbide Catalog ☐
Gage Catalog ☐

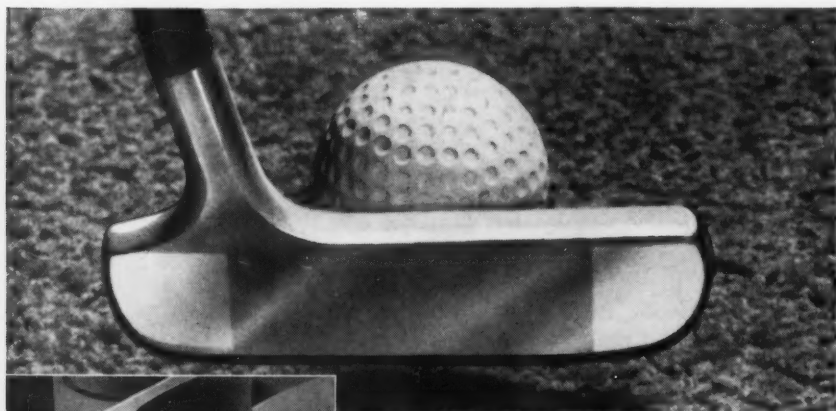
Your Name _____

For more data circle 371 on Postpaid Card



For the finishing touch that means so much!

Whether you're polishing the business end of a stainless steel golf club or smoothing out the rough spots in precision instrument parts, Jewel Brand Coated Abrasives ensure faster, finer finishing. On job after job, experience proves that **end products cost less when you finish with Jewel Brand Abrasives.** Prove it for yourself now, by bringing their many money-saving advantages to bear on your own finishing problems. Order from your Industrial Distributor or write for specific recommendations. Abrasive Products, Inc., 507 Pearl Street, South Braintree 85, Mass.



COATED ABRASIVES

Belts • Rolls • Sheets • Discs • Specialties

ABRASIVE PRODUCTS, INC.

South Braintree 85, Massachusetts

For more data circle 372 on Postpaid Card

New!



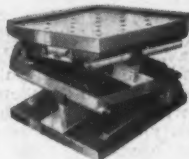
"MAGNA-SINE" WITH
MAGNETIC TABLE

Robbins features for NEW SPEED, ACCURACY, SAVINGS ... on every angular SET-UP!

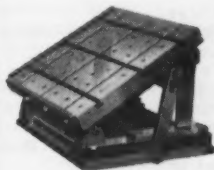
These exclusive new features make Robbins angular tooling equipment *even more* valuable to every shop, large or small: (1) NEW O. S. Walker Multi-Pole Fine Division Permanent Magnet Chuck ... the most powerful ever built! (2) NEW ribbing in base, intermediate and top plates for distortion-free strength and rigidity! (3) NEW "Perma-Flat" Swivel Block keeps gage blocks securely in place! (4) NEW full-length roll bar radius ground from solid for positive seating, greater accuracy! (5) NEW Robbins positive locking device! Add to these the proven Robbins design principle which makes setting up to machine, grind or inspect any angle a simple, four-step job that takes minutes instead of hours ... and you see why every shop needs these tools. Free demonstration on your job.



**NEW! Catalog shows complete
range of models and sizes.
Write for your free copy.**



INSPECTION AND LIGHT
MACHINING SINE PLATE



HEAVY DUTY SINE PLATE
FOR MACHINING

OMER E.

11961 DIXIE AVENUE

Robbins

DEPT. B

COMPANY

DETROIT 39, MICH.

For more data circle 374 on Postpaid Card

June, 1958

modern machine shop 69

free literature

**Use Postpaid Cards opposite page 32
and inside back cover for requesting
free copies of literature listed below.**

Sharpening Equipment

Black Diamond Saw and Machine Works, 127 North Ave., Natick, Mass. 4-page catalog on sharpening machines for band and circular saws. These three machines sharpen all band saws, woodcutting rip saws and knives and non-ferrous metal cutting saws. Catalog includes information on the use and advantages of each unit.

For more data circle 1 on Postpaid Card

Band Saw Guides

Carter Products Co., 30 Ionia Ave., S.W., Grand Rapids, Mich. A catalog and operating manual featuring an extensive line of band saw guides. This literature depicts three different types of guides in a wide range of models and sizes, plus a newly developed line of universal mounting brackets to fit the guides on any standard band saw machine. Also included are rules and suggestions pertinent to any band sawing operation.

For more data circle 2 on Postpaid Card

Alloys

Cerro de Pasco Sales Corp., 304 Park Ave., New York 22, N. Y. 8-page "How To" booklet illustrates and lists the principal industrial applications of the low-temperature-melting Cerro alloys. Also included are brief descriptions of the various alloys and a listing of their physical properties.

For more data circle 3 on Postpaid Card

Rolling Mills

The Fenn Manufacturing Co., 904 Fenn Rd., Newington, Conn. Catalog on the Fenn Standard Line, from 20 to 3 inch roll diameter mills, a complete section on mills for laboratory and advanced development, wire flattening mills, and a complete line of related accessories.

For more data circle 4 on Postpaid Card

Throwaway Inserts

Adamas Carbide Corp., Kenilworth, N. J. Booklet "Throwaway Tooling Set-up and Follow-Thru" outlines how the user can obtain maximum throwaway tooling results through the proper use of correct style holders and inserts.

For more data circle 5 on Postpaid Card

Barrel Finishing

Almco, Queen Products, Inc., 82 Marshall St., Albert Lea, Minn. A 52-page catalog containing facts on barrel finishing. Illustrates typical installations, how to select the proper finishing barrel and includes detailed cost chart on finishing typical parts.

For more data circle 6 on Postpaid Card

Shearing and Forming Machines

American Pullmax Co., Inc., 2455 N. Sheffield Ave., Chicago 14, Ill. File folder containing individual bulletins on the different models of universal shearing and forming machines.

For more data circle 7 on Postpaid Card

Stainless Steel Tubing and Pipe

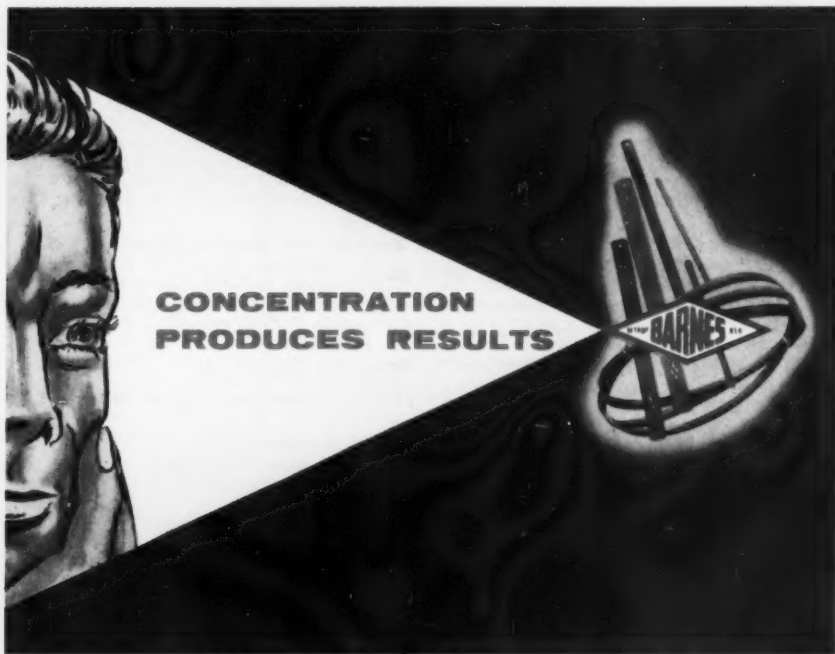
The Babcock and Wilcox Co., Tubular Products Division, Beaver Falls, Pa. Technical data card 148A summarizes hot working, annealing, welding and forming data on 24 of the austenitic and hardenable and non-hardenable ferritic stainless tubing steels.

For more data circle 8 on Postpaid Card

Thimble Micrometer

Brown and Sharpe Manufacturing Co., Providence 1, R. I. Bulletin describing the convertible thimble micrometer which features oblique graduations, lever type lock, one piece stainless steel spindle and screw, simple wear adjustment, adjusting nut and so on.

For more data circle 9 on Postpaid Card



... and BARNES concentrates on producing the best in saw blades

**POWER
HACK SAWS**

•

**HAND
HACK SAWS**

•

BAND SAWS

Everyone knows that effective results require concentration. That's why the W. O. Barnes Company concentrates all of its efforts on one product line — **hack and band saw blades**. This high degree of specialization and resultant know-how provide that **extra** cutting quality found only in Barnes Blades. You are assured of receiving the same high performance from every blade in the complete Barnes line.

You'll find, too, that the **right** Barnes blade, properly selected and properly used, can reduce your production cutting costs to a minimum.

Your Barnes Distributor, working closely with his Barnes Engineer, is fully qualified to assist you on blade selection and use.

Call your Barnes Distributor today for reduced costs tomorrow.



W. O. BARNES co., inc.

SUBSIDIARY OF NICHOLSON FILE COMPANY

1297 TERMINAL AVENUE • DETROIT 14, MICHIGAN

For more data circle 375 on Postpaid Card

June, 1958

modern machine shop 71

free literature . . . (For free literature use postpaid card opposite inside back cover)

Magnesium Angle Plates

The Challenge Machinery Co., MMS-3, Grand Haven, Mich. Bulletin on pattern makers magnesium angle plates. Hardened steel runners on base and 8 by 8 inch hardened steel plates on top which are identical with height blocks for increasing height.

For more data circle 10 on Postpaid Card

Milling Machine

The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. A 6-page bulletin describing and illustrating the features of the 1-D Toolmaster Milling Machine. A specification table is included.

For more data circle 11 on Postpaid Card

Diamond Wheels

Clipper Diamond Tool Co., Inc., 345-C Hudson St., New York 14, N. Y. "Clipper Diamond Wheels" gives practical information on diamond wheels and grinding techniques. This catalog covers a selection of grinding wheel types, with sectional drawings, dimensions, diamond concentrations, general characteristics of different bonds, proper selection of types, wheel markings and so on.

For more data circle 12 on Postpaid Card

Die Casting Process

Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Catalog on tool steels for the die casting process which itemizes the essential characteristics of die steel. Requirements for all die casting tools are analyzed, together with data on quenching, tempering, nitriding and the influence of lubrication.

For more data circle 13 on Postpaid Card

Die Casting Machines

DCMT Sales Corp., Dept. DE1128, Div. British Industries Corp., Port Washington, N. Y. A bulletin illustrating and describing a complete line of die casting machines producing up to 1,000 pieces per hour.

For more data circle 14 on Postpaid Card

Shell Trimmer

Dayton Rogers Manufacturing Co., Minneapolis 7, Minn. 4-page bulletin on the Dayton Rogers St-4 sliding knife drawn shell trimmer. Capacity: 800 shells/hr. any shape within 6 inch diameter.

For more data circle 15 on Postpaid Card

Drill and Tap Machine

Burgmaster Corp., 13226 S. Figueroa St., Dept. MM-5, Gardena, Calif. Literature describes bench model auto-indexing turret drill and tap machine which features preselective depth control stops, sensitive feed handle, 2-step pulley drive, universal drive, drill chuck and so on.

For more data circle 16 on Postpaid Card

Chuckling and Indexing Fixtures

J. W. Dearborn, 70 S. Cliff St., Ansonia, Conn. 8-page catalog listing the features of the Model H chucking and indexing fixture, also the automatic indexer. A list of parts for the Model H automatic chucking and indexing fixture are included in this catalog.

For more data circle 17 on Postpaid Card

Flame Hardened Rolls

Detroit Flame Hardening Co., 17644 Mt. Elliott Ave., Detroit 12, Mich. Catalog on flame hardened rolls and engineering chart with ranges for hardness and depth usually required in rolls. Illustrations demonstrate the sizes and kinds of rolls that are regularly flame hardened, for such as steel, rubber, paper, glass and food industries.

For more data circle 18 on Postpaid Card

Fountain Brush

The Dykem Co., 2301F N. 11th St., St. Louis 6, Mo. Bulletin containing information on the Dykem fountain brush in bottle which consists of soft hair brush with hollow handle attached to squeezable translucent bulb joined to screw cap of non-breakable bottle.

For more data circle 19 on Postpaid Card

Heating Units

Hevi-Duty Electric Co., Milwaukee 1, Wis. 4-page bulletin giving complete information on flat type electric heating units and semi-cylindrical electric heating units. Specification tables also given.

For more data circle 20 on Postpaid Card

Inspection Unit

Wright Tool Co., 4316 N. Woodward Ave., Royal Oak, Mich. Bulletin illustrating and describing the portable inspection unit which features raised top safety edge, pull-out writing desk, retractable folding seat, file drawers, compartment area and so on.

For more data circle 21 on Postpaid Card

DIEMAKERS!

this

DIE-PART PORTELVATOR®

(OR AN ENGINEERED VARIANT)

will speed your work
and ease your "handling."

Top plate raises and lowers for fitting operations
and rotates 360° to give easy access to die.



Write for our
FREE Bulletin No. 2548.
It gives full details.



THE HAMILTON TOOL COMPANY • 828 SOUTH NINTH ST.

HAMILTON • OHIO • U. S. A.

For more data circle 376 on Postpaid Card

June, 1958

modern machine shop 73

Pipe and Tube Cut-Off Wheels

Continental Machine Co., 2345 W. Nelson St., Chicago 18, Ill. Bulletin giving complete information on the pipe and tube cut-off wheels which have True-Angle Bevel. Also included are specifications and dimensions.

For more data circle 22 on Postpaid Card

Lifting and Handling Devices

Economy Engineering Co., 4507 W. Lake St., Chicago 24, Ill. Bulletin DLK-305 illustrates and describes the Type DLK Shoplifter which is designed to handle all standard 55 gallon drums between floor level at a height of 57 inches. DX-875 covers the Type DX Shoplifter which is available in two models having capacities of 1,000 and 2,000 pounds.

For more data circle 23 on Postpaid Card

Dies and Machinery

Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa. 12-page catalog on square and hexagon shape drawing dies, round wire, bar and tube drawing dies, nibs, nail tooling inserts, barbing laps, diecarb straight perforators, diecarb button head perforators and die finishing equipment.

For more data circle 24 on Postpaid Card

Bore Gage

Foster Supplies Co., 6122 Milwaukee Ave., Chicago 30, Ill. Catalog on Diatest high precision bore gage. This literature indicates that all units and sets overlap in size for complete range, and come equipped with corresponding Ring Gages as comparators. Exact continuous readings are indicated on large dial.

For more data circle 25 on Postpaid Card

Flat Finishing Machines

Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich. Catalog on abrasive belt flat finishing machines which are single and multi-head machines. These are available with heads to accommodate belts 6, 8, 10 and 12 inches wide.

For more data circle 26 on Postpaid Card

Pilot Valves

Logansport Machine Co., Inc., 801 Center Ave., Logansport, Ind. Catalog on the line of 3-way pneumatic pilot valves, which are available with three mounting styles and three types of operators. The many features of these valves are listed.

For more data circle 27 on Postpaid Card

Spacer Table

Industrial East Co., P. O. Box 561, Clifton, N. J. A 4-page bulletin giving complete descriptions and features of an automatic positioning spacer table and also specifications.

For more data circle 28 on Postpaid Card

Thread Rolling Heads

Landis Machine Co., Waynesboro, Pa. This bulletin is devoted to the No. 5 Series Thread Rolling Heads and includes design and operating features complete with illustrations and specifications.

For more data circle 29 on Postpaid Card

Arc Welder

The Lincoln Electric Co., Dept. 3518, Cleveland 17, Ohio. 6-page catalog illustrates and describes the features of the Lincoln ML-3 "Mechanized Squirt Welder," which is a semi-automatic, submerged arc welder.

For more data circle 30 on Postpaid Card

Plug and Ring Gages

Lincoln Gage Co., 23906 Harper Ave., St. Clair Shores, Mich. Literature available on a complete line of plug and ring gages of unusually high metal hardness for long wear life.

For more data circle 31 on Postpaid Card

Flat Stock

Marshall Steel Co., Box 108-M, LaGrange, Ill. Catalog describing and illustrating the complete line of ground flat stock — Oilcrat, Aircrat, Marshallcrat, over 2,000 sizes. Also oil hardening (SAE 01) water hardening (commercial) drill rod and dowel pins.

For more data circle 32 on Postpaid Card

Single Acting Cylinders

Mead Specialties Co., 4114 N. Knox Ave., Chicago 41, Ill. 8-page bulletin illustrating and describing single acting air-clamp cylinders, Models H1-X23, H-42, H-18-S, V-18-S, V-4-SS, V-18-SS, F-18-S and so on.

For more data circle 33 on Postpaid Card

Drill Jig Bushings

W. F. Meyers Co., Bedford, Ind. Catalog containing complete descriptions and specifications on carbide inserted drill jig bushings. In addition to slip renewable and fixed renewable bushings the catalog covers head and headless press fit type bushings.

For more data circle 34 on Postpaid Card

VARIMATIC[®]

The SUPER SENSITIVE, SMALL-HOLE, PRECISION DRILLING MACHINE

With capacity of .004" to $\frac{3}{16}$ " in all drillable materials, and spindle speeds from 840 to 9300 R.P.M. infinitely variable in two speed ranges . . . this is the machine which the precision industries rely upon to handle the "heart-break jobs."

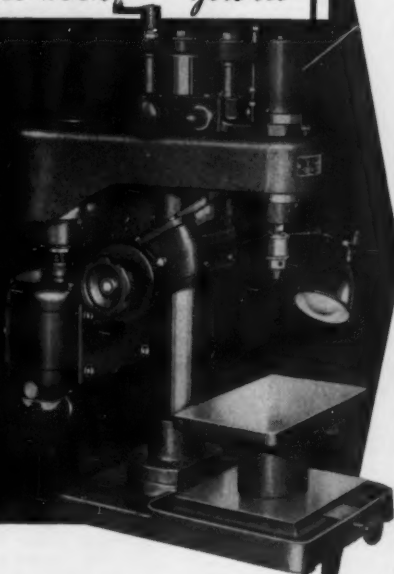
"for the finest work you do"

ALSO . . .

Three companion drills, each built to the same accuracy but differing in drive, speed range, and clearances, to cover the full range of special precision requirements.

AND A TAPPER . . .

with capacity from .034" x 120 to $\frac{1}{4}$ " x 24 . . . and a "reserve of accuracy."



2488

You will want full information about the Hamilton Line of precision drilling and tapping machines. And we will be glad to furnish it.

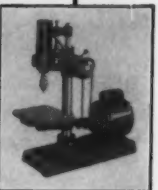
Ask for our
FREE
BULLETIN NO. 2488



THE HAMILTON TOOL COMPANY
828 South Ninth Street
HAMILTON, OHIO

For more data circle 377 on Postpaid Card

ADDRESS





Produce
MORE
Holes... Accurately
Threaded

... because these taps ARE accurate
... with squares, shanks, threads, OD's and
threads all precision machined and ground on
centers. Correctly designed for fast, free cutting.
Heat treated for longer life. Write for complete in-
formation. Ask about the custom tap service P&W
offers you at no extra cost!

PRATT & WHITNEY TAPS
A COMPLETE RANGE OF TYPES AND SIZES IS AVAILABLE
FROM STOCK AT THE P & W BRANCH OFFICE NEAR YOU.

For more data circle 378 on Postpaid Card

free literature . . . (For free literature use postpaid card opposite inside back cover)

Wheel Dresser

Hoglund Engineering and Manufacturing Co., Inc., 369 Snyder Ave., Berkeley Heights, N. J. Literature on the Model 105 hydraulic contour wheel dresser for use on surface grinders.

For more data circle 35 on Postpaid Card

Coolant Units

Madison Industries, Inc., Muskegon, Mich. Bulletin illustrating and describing high pressure coolant units and special coolant systems. This bulletin gives specifications and features of these units.

For more data circle 36 on Postpaid Card

Knives and Cutters

The Ohio Knife Co., Dept. 73-HH, Cincinnati 23, Ohio. Bulletin featuring super trimmer knives, chipper knives, high speed revolving cutters, scraper and doctor blades, circular slitting cutters, circular box board cutters and so on.

For more data circle 37 on Postpaid Card

Wood Bearings

Paramount Oilless Bearing Co., Inc., 99 Hope Ave., Worcester, Mass. A bulletin illustrating and describing self-lubricating wood bearings and giving important features. Also included in this catalog are pillow blocks and hardwood sheaves.

For more data circle 38 on Postpaid Card

Air Tools

Pratt and Whitney Co., Inc., 25 Charter Oak Blvd., West Hartford, Conn. Bulletin describing the three models of Kellerflex high speed air tools. Specification table is included.

For more data circle 39 on Postpaid Card

Cooling Unit

Precise Products Corp., 3745 Blue River Rd., Racine, Wis. Catalog describing Vapor Lub Cooling. Also included are the single nozzle, two nozzle and multiple nozzle cooling units.

For more data circle 40 on Postpaid Card

Thread Rolling Heads

The National Acme Co., 183 E. 131st St., Cleveland 8, Ohio. Acme-Fette self opening thread rolling heads, for rotating or non-rotating spindle machines, roll all parallel thread forms at speeds equal to turning speeds with high speed steel tools.

For more data circle 41 on Postpaid Card

Centers and Grinder Dogs

Ready Tool Co., 150 Garfield Ave., Stratford, Conn. This catalog includes anti-friction Superaccurate and anti-friction bull and pipe grinder centers, high-speed steel and carbide-tipped centers and so on. Red-E reversible grinder dogs, for use with anti-friction or solid centers are illustrated in steel and aluminum styles, along with cam action and adjustable dogs.

For more data circle 42 on Postpaid Card

Milling, Drilling and Boring Machine

The Portage Machine Co., 1041 Switzer Ave., Akron 11, Ohio. Bulletin giving specifications, attachments and accessories on the Model 3 horizontal, milling, drilling and boring machine.

For more data circle 43 on Postpaid Card

Die Benders

J. A. Richards Co., Dept. 6-M, Kalamazoo, Mich. Circular R-80 on the Multiform No. 6 Hydraulic Bender for bending steel or other material up to 3/16 by 2 inches. For more data circle 44 on Postpaid Card

Shoe Clamps

Standard Parts Co., 1000 Broadway, Bedford, Ohio. Bulletin on swivel toggle shoe clamps for any mechanical jaw where push and pull pressure is required.

For more data circle 45 on Postpaid Card

Band Saw

The L. S. Starrett Co., Athol, Mass. Bulletin featuring the Safe-Flex high speed steel band saws which are available in standard lengths with four different widths and a variety of pitches. Specification table included.

For more data circle 46 on Postpaid Card

Coolant Separators

Sundstrand Machine Tool Co., 2539 Eleventh St., Rockford, Ill. 4-page bulletin giving features of the magnetic coolant separators which are available in capacities of 25, 50, 75 and 100 GPM.

For more data circle 47 on Postpaid Card

HIGH Precision at LOW Cost

THE PRATT & WHITNEY SIGMATIC COMPARATOR...

a moderately priced instrument that combines the simplicity and dependability of mechanical gaging with unusual accuracy. Magnification range from 300X to 5000X. Repeatability to millionths of an inch. Self-contained, readily portable. For a wide range of external gaging operations. Ask for Circular No. 599, Pratt & Whitney Company, Inc., 25 Charter Oak Blvd., West Hartford, Conn.



PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 379 on Postpaid Card



**GRINDS
THEM ALL!**

Radii, angles or tangents
straight or tapered flutes
square, radius or ball ends... this
machine grinds practically any special
or standard cutting tool quickly, accu-
rately, economically. Learn how you can
reduce tool costs, improve work quality, cut
machining time — write for Circular No. S455-8.

**PRATT & WHITNEY
CUTTER and RADIUS
GRINDER**

For more data circle 380 on Postpaid Card

free literature . . . (For free literature use postpaid card opposite inside back cover)

Power Chucks and Rotating Cylinders

The S-P Manufacturing Corp., Solon, Ohio. Catalog No. 112 illustrates and describes the S-P Power Chucks which are self-centering or compensating, American Standard or serrated, 2 or 3 jaws, sizes 6 to 18 inch, and the S-P Rotating Cylinders in sizes 3 to 16 inch bore (air), 3 to 8 inch bore (hydraulic, 500 p.s.i.) air and hydraulic.

For more data circle 48 on Postpaid Card

Set Screws

Set Screw and Manufacturing Co., 152 Main St., Bartlett, Ill. 6-page bulletin on the Setko "Jewel Case" which contains Jail-Lok set screws, self-tapping, truncated, self-tapping fluted, Pivot-Lok, slotted set screws, Nu-Cup, slotted pipe plug, off-set, self-locking, fluted socket, hexagon socket, Zip-Grip, socket pipe plug, Super-Tork, Pre-Tork, socket cap, Jam-Lok and so on.

For more data circle 49 on Postpaid Card

Machine Tools

South Bend Lathe Works, South Bend 22, Ind. 80-page catalog No. 5800 illustrates and describes the entire line of precision machine tools. Equipment shown includes engine lathes, toolroom lathes, turret lathes, vertical spindle milling machines, bench shapers, drill presses and pedestal tool grinders. Attachments, tools, chucks and accessories for all South Bend Machine Tools are also listed.

For more data circle 50 on Postpaid Card

Hydraulic Cylinders

The Sheffer Corp., 326 W. Wyoming Ave., Cincinnati 15, Ohio. Bulletin No. 658 gives information on the C4H Series 1½ inch bore hydraulic cylinder. This cylinder is of the square-head, all-steel interchangeable type, featuring 14 standard mountings and 4 rod end styles. It is rated at 2000-3000 p.s.i.

For more data circle 51 on Postpaid Card

Hydraulic Shop Presses

Rodgers Hydraulic, Inc., 7447 Walker St., Minneapolis 26, Minn. Catalog No. 313B describing and illustrating complete line of hydraulic shop presses—60 to 400 tons. Also included in this catalog are power pumps for shop presses, hand pumps and cylinders.

For more data circle 52 on Postpaid Card

Air Gaging Cartridges

The Sheffield Corp., Dayton 1, Ohio. A 32-page catalog tells where and how to use Plunjet air gaging cartridges in single and multiple dimension gages and inspection fixtures. Complete engineering specifications on Plunjet and typical applications are included.

For more data circle 53 on Postpaid Card

Hydraulic Oils

Sun Oil Co., Philadelphia 3, Pa. "Hydraulic Fundamentals and Industrial Hydraulic Oils"—a 44-page catalog giving an introduction to the principles of hydraulic systems, with illustrated explanations of the most important types of valves, pumps, motors, torque converters and accessories.

For more data circle 54 on Postpaid Card

Lathes

Seneca Falls Machine Co., 14 Fyfe Building, Seneca Falls, N. Y. Bulletin Q-57 describing the Model Q double-way tracer type automatic lathes is available. Specifications, features, diagrams of tooling set-ups, chip disposal methods and types of turning and squaring carriages are included in this bulletin.

For more data circle 55 on Postpaid Card

Air Hoists

Thor Power Tool Co., Prudential Plaza, Chicago 1, Ill. 4-page catalog featuring illustrations and descriptions of the Thor H-1000 air hoists. This bulletin includes tables on rate of ascent and descent under various load conditions and air pressures. Manuals on the lightweight, 1000 pound, chain hoists may also be had.

For more data circle 56 on Postpaid Card

Carbide and High Speed Cutting Tools

Spiral Step Tool Co., 5400 N. Damen Ave., Chicago 25, Ill. Catalog giving information on carbide and high speed cutting tools such as radial form grinder, Spiral automatic step drill grinder, Universal relieving lathe and so on.

For more data circle 57 on Postpaid Card

For HIGH-SPEED FINISHING

... New KELLERFLEX AIR TOOLS

handle higher speeds under load, save time, insure finer work for burring, grinding and other intricate finishing operations on dies and similar work. Lightweight, compact, vibration-free, easy to use with one hand.

Three models provide 20,000, 40,000 and 60,000 rpm. Collets $\frac{1}{8}$ " and $\frac{1}{4}$ ".

Perfect supplement to our

popular line of Kellerflex

Flexible Shaft

Machines.



PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

Write for Circular No. 587.
PRATT & WHITNEY Co., Inc.
25 Charter Oak Blvd.,
West Hartford, Conn.

For more data circle 381 on Postpaid Card

free literature . . . (For free literature use postpaid card opposite inside back cover)

Optical Dividing Heads

George Scherr Co., Inc., 200-MM, Lafayette St., New York 12, N. Y. 4-page bulletin describing and illustrating optical dividing heads featuring types OW7 and OW12 with specification table included.

For more data circle 58 on Postpaid Card

Speed Press

Studebaker Hydraulic Products Co., 1733 N. 33rd Ave., Melrose Park, Ill. 4-page bulletin illustrating and describing the air-hydraulic speed presses which have removable replaceable power package. Also are specifications and dimensions.

For more data circle 59 on Postpaid Card

Radius Tools

C. B. Teeter, 4470 Oakenwald Ave., Chicago 15, Ill. A bulletin describing the new series precision radius tools for 9 to 13 inch bench, floor and engine lathes designed for tool and die makers, also featuring the Shaplane radius tool.

For more data circle 60 on Postpaid Card

Face Mill Cutters

Vascoloy-Ramet Corp., 812 Market St., Waukegan, Ill. Complete data on the expanded line of V-R face mill cutters for throw-away inserts. These cutters are now available in both negative and neutral rake designs and right and left-hand styles, to fit both "c" arbors and spindle nose.

For more data circle 61 on Postpaid Card

Hardness Tester

Wilson Mechanical Instrument Division, American Chain and Cable Co., Inc., 230 Park Ave., New York 17, N. Y. 2-page bulletin, TT-58, describes the Model TT Rockwell TwinTester, a combination Rockwell and Rockwell Superficial hardness tester which was designed for use in laboratories, tool departments, small lot metal jobber shops and so on.

For more data circle 62 on Postpaid Card

Drill Press and Machine Vises

Wilton Tool Manufacturing Co., Inc., Schiller Park, Ill. Described in this catalog are a completely new drill press vise and the improvements in Wilton's Milomatic air-hydraulic vise. These drill press vises are designed to provide huge jaw capacity within compact overall dimensions. Six models are available, three of which have the patented Rapid Titan Nut, for free sliding action plus unlimited takeup.

For more data circle 63 on Postpaid Card

Remote Control for Valves

Stow Manufacturing Co., 1 Shear St., Binghamton, N. Y. 4-page bulletin entitled "Use of Manual Remote Controls for Valves" gives advantages and use of flexible shaft and standard rigid reach rod controls for remote control of valves. Illustrated are commercial applications.

For more data circle 64 on Postpaid Card

Chucks

Thomas Hoist Co., 28 S. Hoyne, Chicago 12, Ill. Bulletin on the Barker Two-Jaw or Three-Jaw hand operated chuck for turret, engine lathes, cutting-off machines, drill presses or any type of chucking machine.

For more data circle 65 on Postpaid Card

Electrical and Lubricating Devices

Trico Fuse Manufacturing Co., Milwaukee, Wis. 8-page catalog describing and illustrating fuses, fuse pullers, fuse reducers, test and fuse clip clamps, automatic oilers and so on.

For more data circle 66 on Postpaid Card

Machine Tools

Walker-Turner Division, Dept. 1003, 400 N. Lexington Ave., Pittsburgh 8, Pa. Brochure giving brief description and outline of specifications on the lightweight machine tools. Tools included: 15 and 20 inch drill presses; radial drill presses; band and scroll saws; tilting arbor saws; 12-inch wood and metal lathes; bench, tool and surface grinders; cut-off machines; a jointer; a spindle shaper; and a belt and disc sander.

For more data circle 67 on Postpaid Card

Bench Metal Punches

Whitney Metal Tool Co., 720 Forbes St., Rockford, Ill. Two folders available on the Whitney Nos. 16 and 17 bench hand metal punches. Dimensions, prices and accessory equipment (including irregular shaped punches and dies) are given.

For more data circle 68 on Postpaid Card

Tube Mills

The Yoder Co., 5532 Walworth Ave., Cleveland 2, Ohio. A 64-page catalog — "Electric Resistance Weld Tube Mills" — provides a step-by-step description of the electricweld process from roll forming and shaping of the tube to the finished product. Photographs, drawings and charts illustrate the operation, capacity and application of various sized electric-weld tube mills.

For more data circle 69 on Postpaid Card

For Longer Life...
Less Kerf... Best Non-Ferrous Cutting

SIMONDS HARD RIM SAW

This Simonds solid saw (new to the market) has already made a *solid* hit! The men who have to get the work out are sold on the Simonds "Hard Rim's" longer cutting life between sharpenings... the better finish it imparts to the non-ferrous metals and plastics it cuts so smoothly... the minimum kerf as against non-solid saw cutting. Yes and everyone likes the Simonds "Hard Rim" because of its non-shattering safety when run at high speeds and the protective advantages to personnel.

This very true cutting saw is available in diameters of 8" to 18". Try it out — call your Simonds Distributor!

For Fast Service
Keep
Complete Stocks

Call your
SIMONDS
Industrial Supply
DISTRIBUTOR



SIMONDS
SAW AND STEEL CO.

FITCHBURG, MASS.

Factory Branches in Boston, Chicago, Shreveport, La., San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que. Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.,
Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

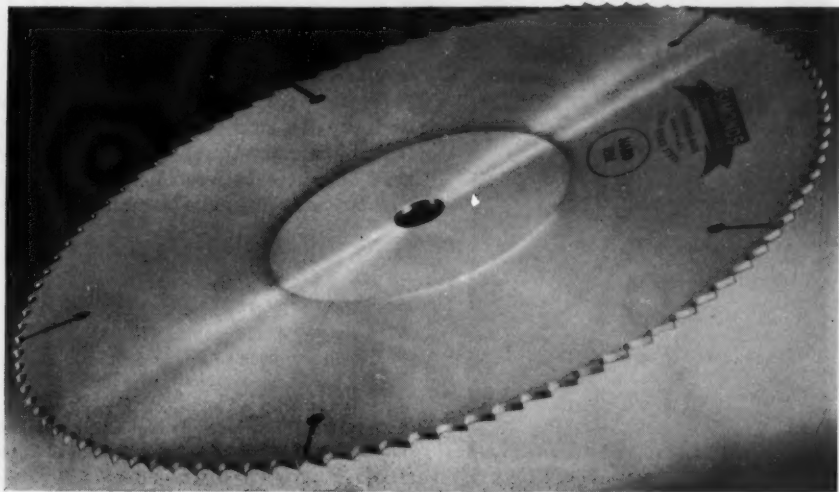


QUICK FACTS

Saw Rim — Made very hard for unparalleled resistance to abrasion and wear

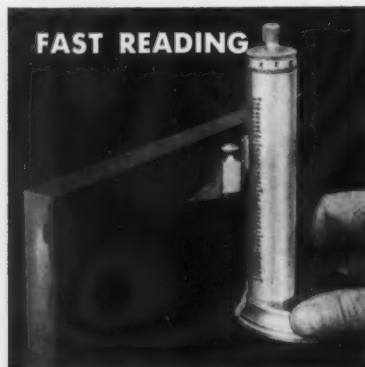
Saw Body — Made just hard enough to keep the saw cutting straight

Resharpener — Easily done on standard saw grinding equipment



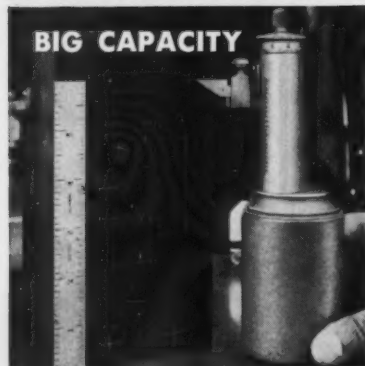
For more data circle 382 on Postpaid Card

MICRO-HEIGHT® GAGE SIMPLIFIES layouts and inspections

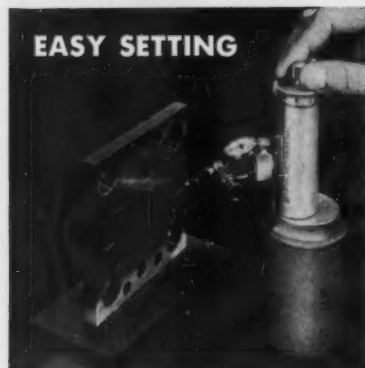


Ends vernier reading problems. Combination of direct reading from zero at base...plus quick and easy movement, saves times, reduces errors, increases accuracy.

- 1 **Micro-Height Gage reads faster than vernier-type gages.** Eliminates need for eye loupe. Hundredths on big barrel... thousandths on easy-to-read thimble. Box at left shows ease-of-use for fast layout.



- 2 **Quickly reversing scriber** by putting it at top of support adds 1" to capacity. You get 3" direct range with Micro-Height "2"; 5" range with Micro-Height "4". To increase capacity up to 6" more, screw lapped Riser into gage base.



- 3 **For fast, accurate inspections**—replace Scriber with your present dial indicator. Now, by rotating thimble, you can quickly read distances between heights or holes without removing gage from surface plate.

Micro-Height "2" (3" range) \$36.50

Micro-Height "4" (5" range) \$57.00

Accuracy $\pm .0003"$. Simple adjustments to maintain accuracy. Rustproof satin-chrome finish.

Accessories

Scribers: steel or carbide tip • Dial-indicator Holder

Risers: 1, 2, 3, 4, 5 and 6 inches • Plush-lined Cases

Call your GREIST distributor or write

THE **GREIST** MANUFACTURING COMPANY, 496 BLAKE ST., NEW HAVEN 15, CONN.

Precision Products since 1871

For more data circle 282 on Reader Card

a complete line

is the shortest
distance to
top production

The shorter the distance the less the cost. Butterfield taps save time, help you improve product quality and cut production costs.

There are Butterfield warehouses in Chicago, Cleveland, Detroit, Fort Worth, Los Angeles, New York, San Francisco.

See your Butterfield Distributor for precision-made drills, reamers, taps, dies, counterbores, cutters, end mills, hobs and carbide tools.



36B.8.10

BUTTERFIELD

... the cutting tools that make the most of your product

BUTTERFIELD DIVISION, UNION TWIST DRILL COMPANY, DERBY LINE, VERMONT
For more data circle 384 on Postpaid Card

Specify **RING** PUNCHES AND DIES

for your perforating problems

Complete interchangeability

Immediate shipments
from stock on Standards

High quality — Long life

LOW COST

STANDARDS IN
ROUND—SQUARE
OBLONG—RECTANGULAR

H. S. SHOULDER AND
BEVEL HEAD QUILLS

TRANSFER PUNCHES

SLUG EJECTOR
PUNCHES

PILOTS—BLANKS

PUNCH & DIE
RETAINERS

CHOICE OF STEELS

WRITE
FOR OUR
ILLUSTRATED
CATALOG
105

*Let us
quote on
your Specials*

Send prints or sketches
for prompt reply.

RING PUNCH & DIE, INC.

FENTON PLACE

JAMESTOWN, NEW YORK

For more data circle 385 on Postpaid Card

... now your distributor can supply **both**

Bunting®

CAST or SINTERED BRONZE

up-to-date

Bearings and Bars all look much alike but when you pick up a Bunting® Stock Bearing or Bar you are holding a product of the most advanced manufacturing methods known today. Superlative quality is assured in all Bunting products by the employment of the latest in metallurgical science and production control equipment.

FIRST AWARD
For Advertising Excellence
Distributors Association
1952 1956 1958



... buy **Bunting Bearings** from your **Bunting Distributor**

Your Bunting distributor is listed in the classified section of your telephone directory usually under Bars—Bronze, and Bearings—Bronze. Two Bunting factories and eleven Bunting Branch Warehouses expedite distribution in all areas. Ask your local Bunting distributor or write for catalogs.

Bunting®

**BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS
OF CAST BRONZE AND POWDERED METAL**

ask for

Catalog No. 52

.. **CAST BRONZE**

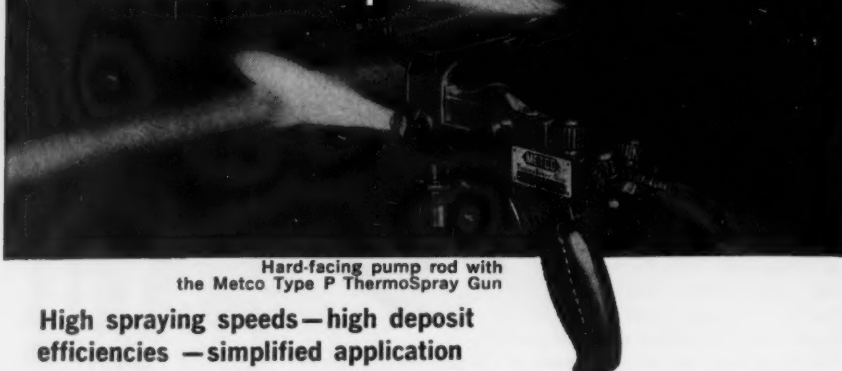
Catalog No. P-56

.. **SINTERED BRONZE**



THE BUNTING BRASS AND BRONZE COMPANY • TOLEDO 1, OHIO • BRANCHES IN PRINCIPAL CITIES
For more data circle 386 on Postpaid Card

Low cost—high speed hard-facing with the new METCO THERMOSPRAY process



Hard-facing pump rod with
the Metco Type P ThermoSpray Gun

High spraying speeds—high deposit efficiencies —simplified application

The advantages of applying hard-facing materials in powder form for lower finishing costs have long been known. But slow spraying speeds, low deposit efficiencies and high material costs have hindered their wide application. Now, with the development of the new METCO Type P THERMOSPRAY GUN and the THERMOSPRAY Hard-Facing Alloys, these disadvantages have been overcome.

The THERMOSPRAY GUN is the first ever developed to operate without compressed air—only oxygen and gas (acetylene or hydrogen) are required. The THERMOSPRAY Powders are new, self-fluxing alloys of the nickel-chromium-boron type especially developed to provide dense, corrosion-resistant coatings with hardnesses varying from RC-30 to RC-65, depending on the alloy used. The new Gun applies these materials

faster than any previously available equipment (8 to 10 lbs. per hr.), with deposit efficiencies of over 95%. Depending on requirements, coatings may be fused after spraying, used semi-fused with a newly developed Metco Process, or left unfused.

Here is your opportunity to do your own hard-facing at low cost. For further information send off the coupon. No obligation, of course.



**Metallizing
Engineering Co., Inc.**

1177 Prospect Ave., Westbury, L. I., New York
Telephone: EDGEWOOD 4-1300

In Great Britain: Metallizing Equipment Co., Ltd.
Chobham near Woking, England

The following trade names are the property of
Metallizing Engineering Co., Inc.:
METCO®, ThermoSpray ® Reg. U. S. Pat. Off.

Don A. Watson
Metallizing Engineering Co., Inc.
1177 Prospect Ave., Westbury, L. I., N. Y.
Please send me more information

- ☐ about the New ThermoSpray Gun
☐ about ThermoSpray Hard-Facing
☐ Please arrange a demonstration in my shop.

name _____
company _____
street _____
city _____ zone _____ state _____

For more data circle 387 on Postpaid Card

*"Carlton's
a valuable
production tool
in jet engine
drilling"*

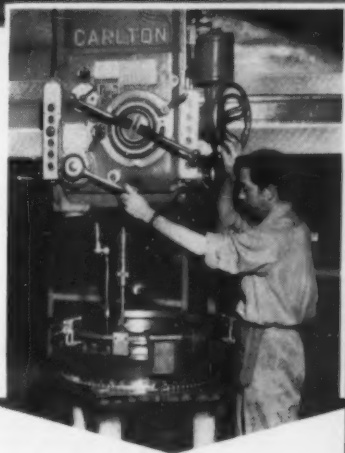


Robert L. Clark, Works Manager, Ryan Aeronautical Co., San Diego, has supervised the production of hundreds of Ryan jet engine structures like the sensational Vertijet shown above. He says:

"Carlton is the kind of radial drill you can count on for production hole drilling like the jet engine H-ring (below)."

It will pay you to investigate Carlton radial drills for all your drilling and boring requirements. Unlimited choice of arm and column sizes and the most modern programming-preselect speed-feed control systems. Write for descriptive bulletins. The Carlton Machine Tool Co., Cincinnati 25, Ohio.

Carlton 3A Radial drills and reams 200 holes in the H-flange of this Ryan jet engine component.



Carlton . . . specialists in Radial Drills

For more data circle 388 on Postpaid Card



DRILLING BOTTLENECKS?

NOT with ACCURATE 
Drill Bushings in your jigs...

You can reduce costly production delays — specify ABC Accurate Drill Jig Bushings.

SAME DAY Shipments — Standard ABC drill jig bushings from our **FACTORY** and conveniently located **WAREHOUSING DISTRIBUTORS**.

SPECIAL sizes get top priority **SERVICE**.

CAREFUL manufacture — from **WEAR-RESISTANT**, chrome alloy bearing steel.

ABC drill jig bushings meet the most rigid standards of **PRECISION** and **DURABILITY**.

Write or phone for a catalog and price list today!



ACCURATE BUSHING CO.

ASA STANDARD BUSHINGS • PRECISION PARTS • LIFT SWING DRILLING FIXTURES

442 North Avenue, Garwood, New Jersey

For more data circle 389 on Postpaid Card

88 modern machine shop

June, 1958



Star Power Hack Saw Blades

To keep your power sawing costs at an absolute minimum, STAR Power Saws are especially designed for heavy duty operation and longer service life. STAR Power Hack Saws are manufactured from the grades of High Speed steels proven best for this purpose. Skilled and experienced saw makers use the most modern equipment for the fabrication and precision heat treatment required for uniformly superior performance. Rigid quality control combined with a progressive research program insures the continued excellence of STAR Power Hack Saw Blades.

STAR SAW BLADES

CUT POWER SAWING COSTS

Star Flexible Back and Skip Tooth Bands

The uniform high quality of STAR Metal Cutting Band Saws assures top efficiency in cutting off operations or in contour sawing. All standard sizes are available so that you can select the band that's right for your purpose. Undercut tooth band saw blades cut sawing costs on softer, non-ferrous metals. Made from the finest quality band saw steels, STAR bands are available in coils or cut to length and welded. Delivery is immediate in 100-ft. specially boxed lengths—or in 250 and 500 ft. coils. Welded bands are also shipped promptly, usually within a day from receipt of order.

Your Industrial Distributor can tell you more about how you can cut production costs by specifying the quality line—STAR brand, Hand Hack Saw Blades, Power Hack Saw Blades, Metal Cutting Band Saws.



FREE TO YOU. Fact-filled booklet gives you valuable information, useful in your job and around the shop—*Star Metal Cutting Guidebook*. Also to put up in your shop as a handy reference—*Star Metal Cutting Wall Chart*. Clip and mail this coupon today.



STAR HACK SAW and BAND BLADES

Manufactured by

CLEMON BROS., Inc. • Middletown, N. Y., U.S.A.

Makers of Hand and Power Hacksaw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Lawn Machines

CLEMON BROS., INC. Middletown, N. Y., U.S.A.

- ☐ Please send the STAR Metal Cutting Guide that contains information on blade types, cutting techniques, feeds and speeds and general metal cutting information.
- ☐ Please send the STAR Metal Cutting Chart—A handy guide for the shop metal worker.

Name _____

Address _____

City _____

Zone _____

State _____

1242

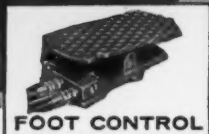
For more data circle 390 on Postpaid Card

June, 1958

modern machine shop 89

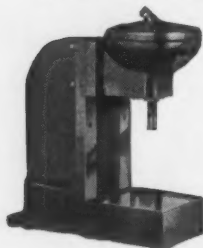
Speedy

AIR VISE



HIGH SPEED • POWERFUL GRIP

New, improved model speeds up all repeat operations—*milling, drilling, tapping, punching, bending, riveting*. Both hands left free to produce more! Light squeeze to 2250 pounds pressure! Extra thick jaws for attaching jigs. Jaws open to 3 inches; $\frac{1}{16}$ " to $\frac{3}{8}$ " maximum travel. With foot control and air hose. **\$44.00**

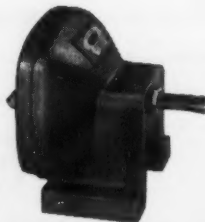


SPEEDY 1-TON AIR PRESS

Does the work of expensive presses! 5-inch throat; Ram 0 to 5"; stroke $\frac{3}{8}$ "; table 5" x 5". Operated by foot or our fingertip controls. \$85.00

SPEEDY AIR RAM No. 70

Mounts in any position. Compact, extremely sturdy. Exerts gentle pressure to one ton thrust. $6\frac{1}{2}$ " high, $5\frac{3}{4}$ " wide. \$35.00



Order from Your Supplier or Write for Air Tool Catalog

W. R. BROWN CORP., 2669 N. NORMANDY AVE., CHICAGO 35, ILL.

AIR REGULATORS • AIR VALVES • AIR FILTERS • PAINT SPRAYERS • AIR COMPRESSORS

For more data circle 391 on Postpaid Card

Now...

Metal Cutting Machine



RACINE
"Utility"
AUTOMATIC

that every shop can afford -

You set it and forget it—that's how this 100% automatic metal cutting machine will substantially reduce labor costs and material waste.

New Precision Electrically Controlled Cycling with 1" push-up in one second greatly increases metal cutting production. Ideal for large or small shops.

Write for Catalog S-66WA showing complete specifications and operating features.

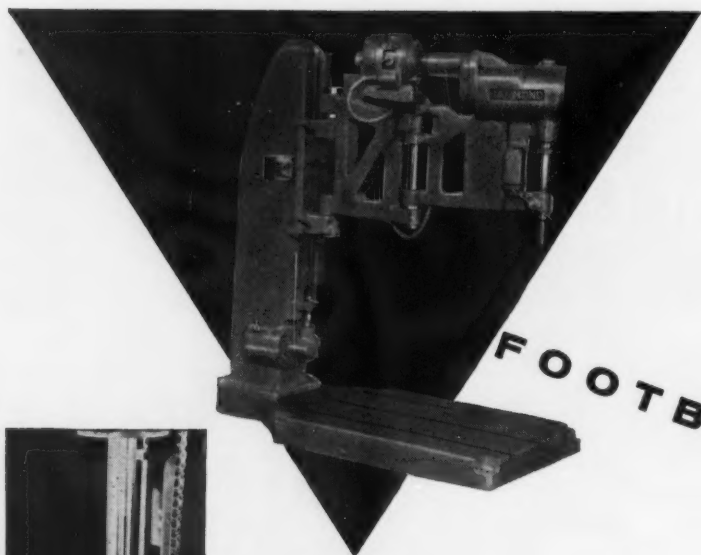
FEATURES

- **CAPACITY** — 6" x 6", Actual 6 $\frac{1}{2}$ " diameter with 10 ft. stock feed.
- **SPEEDS** — Two models available. Model 66W2A, 100 and 140 strokes per min. Model 66W4A, 35, 70, 100 and 140 strokes per min.
- **LIMIT SWITCH CONTROL** — Eliminates clutches and other wearing parts.
- **ACCURACY** — Up to .005".
- **MATERIAL** — Will cut all ferrous and non-ferrous metals.

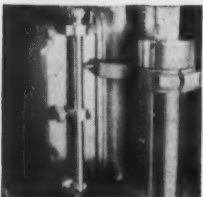
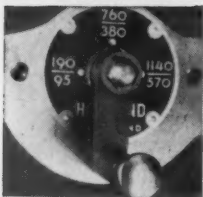
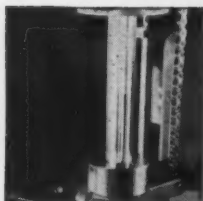
**RACINE
SECO**

Machinery Division

For more data circle 392 on Postpaid Card



FOOTBURT



for **F**aster radial drilling and tapping

Hammond Radial Drilling and Tapping Machines may be spotted in the production line for drilling, tapping or reaming. With its unique Bracket Type construction the spindle can be swung quickly from hole to hole. Six Quick Speed Changes are instantly available and the Hammond Tapping Reverse is very fast and convenient to operate.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio
Detroit Office: 24632 Northwestern Highway, Detroit 35, Mich.

Write for Circular #7A

ENGINEERED FOR PRODUCTION

FOOTBURT

MACHINE TOOLS

For more data circle 393 on Postpaid Card

Men of Modern Machine Shop



JOHN M. KRINGS, Vice President . . .
serving Western Michigan, Illinois,
Wisconsin, Iowa, Minnesota, the
Dakotas, and Northern Indiana.

★ ★ ★ ★



**GENE J. SCHWARBER, Advertising
Manager, serving Missouri and Kansas.**

modern machine shop

ADVERTISING REPRESENTATIVES

**Gene J. Schwarber, Advertising
Manager,** 431 Main Street, Cincinnati 2, Ohio, CHerry 1-5924. Missouri, Kansas.

Duncan W. Barton, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern Pennsylvania, Central New York State, New Jersey, Maryland, Delaware, Washington, D. C., Long Island, Brooklyn.

Granville M. Fillmore, Vice President, 342 Madison Ave., New York 17, N. Y., Murray Hill 7-7390. Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine.

John M. Krings, Vice President, Tribune Tower, Chicago 11, Illinois, Delaware 7-5441. Western Michigan, Illinois, Wisconsin, Iowa, Minnesota, the Dakotas, Northern Indiana.

George E. Hay, 431 Main St., Cincinnati 2, Ohio, CHerry 1-5924. Western Pennsylvania, Western New York, Ohio, Kentucky, Southern Indiana.

Jeryl L. Marlatt, 764 W. Lincoln Ave., Birmingham, Mich., MIDwest 6-3678. Eastern Michigan, Northwestern Ohio.

Norman S. Rogers, 431 Main Street, Cincinnati 2, Ohio, CHerry 1-5924. Central Indiana.

The Robert W. Walker Company, 730 South Western Ave., Los Angeles 5, Calif., DUNKirk 7-4388, 57 Post St., San Francisco 4, Calif., SUTter 1-5568. California, Oregon, Washington.

★ ★ ★ ★

modern machine shop
431 Main St. Cincinnati 2, Ohio

OVER THE EDITOR'S DESK . . .



METALWORKING MACHINERY

Metalworking machine shipments during 1957 approximated \$1,101 million as compared with \$1,138 million for the year 1956, according to the Metalworking Equipment Division, Business and Defense Services Administration and the Bureau of the Census, U. S. Department of Commerce.

The 1957 estimated shipments included \$793 million of cutting type machines and \$308 million of forming and shaping types as compared with \$834 million and \$304 million, respectively, for 1956.

Lathes, milling machines, grinding machines, and boring machines were the principal types of cutting machines shipped during 1957, while mechanical presses, hydraulic and pneumatic presses, and bending and forming machines accounted for the major portion of forming and shaping machine shipments that were made.

New orders for metalworking machines during 1957 approximated \$679 million reflecting a decrease of 40 percent from the 1956 level of \$1,137 million. The estimated new orders for 1957 included \$538 million of cutting type machines and \$140 million of forming and shap-

ing type as compared with \$903 million and \$234 million, respectively, for 1956.

Cutting Type Machines

Shipments of cutting type machines during 1957 approximated \$793 million, reflecting a decrease of 5 percent from 1956 shipments of \$834 million.

During 1957 lathes were the principal type of cutting machine shipments, accounting for 25 percent of total shipments. Milling machines were next in importance and accounted for 17 percent of total, while grinding, boring and drilling machines accounted for 15 percent, 13 percent and 7 percent, respectively, of the total shipments. Gear cutting and finishing machines, broaching machines, and planers were of relatively minor importance.

New orders during 1957 totaled \$538 million indicating a decrease of 40 percent from the 1956 level of \$903 million.

Lathes again accounted for the largest portion of new orders with 28 percent of the total, followed by grinding machines, 17 percent; milling machines, boring machines, and drilling machines, 16 percent, 14 percent and 7 percent, respectively. Broaching machines, gear cutting

GRAND RAPIDS

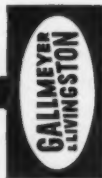
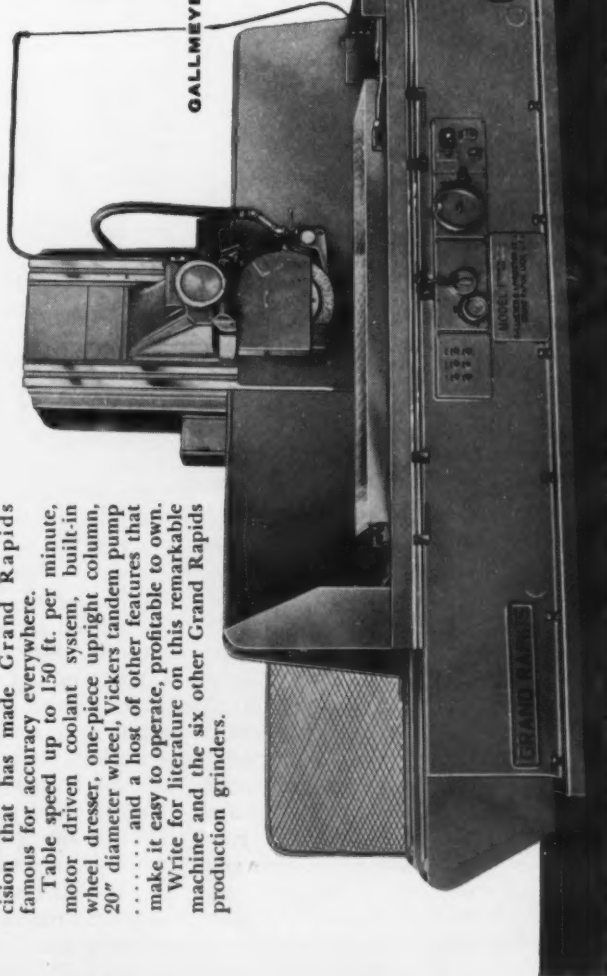
accuracy for production grinding

Now high speed, production grinding can enjoy the same Grand Rapids accuracy that's always been a "must" for the toolroom. The Grand Rapids Model F Production Type Hydraulic Feed Surface Grinder offers the same micro-metric precision that has made Grand Rapids famous for accuracy everywhere.

Table speed up to 150 ft. per minute, motor driven coolant system, built-in wheel dresser, one-piece upright column, 20" diameter wheel, Vickers tandem pump and a host of other features that make it easy to operate, profitable to own.

Write for literature on this remarkable machine and the six other Grand Rapids production grinders.

Grand Rapids Model F Surface Grinder accurately grinds big surfaces at unsurpassed speeds



GALLMEYER & LIVINGSTON CO.
408 Straight Ave., S.W.
Grand Rapids, Michigan



machines and planers were of secondary importance and together accounted for approximately 7 percent of the total new orders.

Cancellations during 1957 approximated \$59 million as compared with \$56 million for 1956. During 1957 cancellations averaged about 11 percent of new orders as compared with 6 percent in 1956.

Unfilled orders decreased from quarter to quarter in 1957 and as of December 31, 1957 totaled approximately \$206 million. On the basis of average monthly shipments during the fourth quarter of 1957 unfilled orders reflected a 4.3 months' backlog as compared to 6.4 months' backlog on December 31, 1956.

Forming and Shaping Machines

Shipments of forming and shaping machines approximated \$308 million, practically equal to the 1956 level of \$304 million.

Mechanical presses, as in 1956, were by far the predominant type of forming and shaping shipments during 1957, approximating \$135 million and accounting for 44 percent of total shipments. Hydraulic and pneumatic presses ranked next in importance with shipments amounting to 28 percent, while bending and forming machines, and punching and shearing machines followed with 11 percent and 9 percent, respectively, of machines shipped. Forging machinery and

hammers accounted for 4 percent of total shipments.

New orders in 1957 totaled \$140 million compared with 1956 new orders total of \$234 million, a decline of 40 percent.

Cancellations during 1957 approximated \$8.2 million, about 6 percent of new orders. During 1956 cancellations were \$16.0 million and approximated about 7 percent of new orders.

Unfilled orders as of December 31, 1957, approximated \$58 million as compared to \$234 million on December 31, 1956. On the basis of average monthly shipments during the fourth quarter of 1957, unfilled orders reflected a 3.6 months' backlog as compared to an 8.6 months' backlog on December 31, 1956.

EXPORTS

Cutting Type Machines

During the year 1957 exports of cutting machines approximated \$119 million, an increase of 22 percent over the 1956 total of \$98 million. During this period Canada was the principal export market with purchases of cutting type machines amounting to \$23 million or 20 percent of total exports. France and Japan ranked next as important markets with purchases by each of about \$18 million or 15 percent.

Lathes and grinding machines continued to be the principal types of exports during the year with gear hobbing, cutting and finishing machines, milling machines and boring machines being of secondary importance. Exports of lathes and grinding machines each approximated \$24 million with each accounting

dependable cutting

...WITH LENOX
BAND SAW BLADES

LENOX
THE TOOLS IN THE RED BOX

Tough flame-hardened teeth, uniformly set to a tolerance of .001", retain their razor-sharp edges even under strenuous cutting conditions.

Produced under exacting quality control and modern machining techniques, LENOX band saw blades perform consistently and accurately on all types of machines.

Engineering and research facilities are at your service for the solutions to your cutting problems and production questions. Call or write today for full information.

AMERICAN SAW & MFG. COMPANY
SPRINGFIELD • MASSACHUSETTS • U.S.A.



for 20 percent of the exports of cutting type machines.

Forming and Shaping Machines

During 1957 exports of forming and shaping machines amounted to \$64 million, an increase over 1956 with exports of \$42 million.

Canada, as in 1955 and 1956, again was the principal export market for forming and shaping machine shipments accounting for \$16 million, or 26 percent of total exports. France accounted for approximately 17 percent of total forming and shaping exports.

For the year 1957, metalworking presses were the principal type of exports, approximating \$19.4 million or 31 percent of total forming and shaping exports. Forging machinery and hammers totaled \$9.4 million or 15 percent and bending and forming machines totaled \$8.7 million or 14 percent of exports.

IMPORTS

For the year 1957 imports of metalworking machines, cutting and forming types, approximated \$36 million, an increase of 49 percent over the 1956 level of \$25 million. West Germany, Switzerland, and the United Kingdom, as in 1956, were the principal sources of imports. West Germany had shipments of \$11.3 million or 31 percent, Switzerland and United Kingdom each had \$7.5 million or 21 percent of all import shipments.

SOUND TAXATION INCENTIVE TO PROGRESS

Tax policy can be an incentive to national progress, according to a recent address given by L. L. Colbert, president of Chrysler Corporation, at The Citadel, The Military College of South Carolina. "For too long a time people have talked about taxation in negatives," he said.

"Used in such a way as to keep in proper balance the incentives of individuals and the sound progress of the country as a whole, tax laws and tax administration can tap the greatest of all resources—the will of men—and put it to work in the nation's interest," Colbert said.

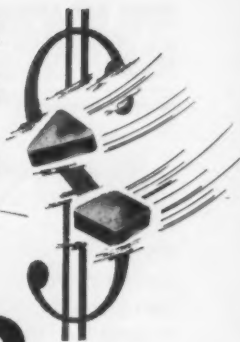
Colbert urged that the corporate federal income tax allowances to replace worn out or obsolete equipment be increased to meet the fast rate of change in modern industry.

"There was a time not so long ago when a piece of machinery was generally used until it wore out," he said. "Under present conditions, however, few machines are ever in use long enough to wear out. Long before that time they get out of date and have to be scrapped.

"The length of life of machinery today is determined by the pace of technological progress—not by the length of time it takes to tire out a piece of iron. You may have to scrap your machines because new ones are more efficient or because your product has changed so much the old machine won't do the job. So, under present conditions, you have to write off the cost of most of your equipment at a much faster rate than you did 20 years ago.

newest
carbide
development

drastically CUTS YOUR
MACHINING
COSTS



NEWPRO
by **NEWCOMER**

a low-cost general purpose
carbide ... made possible through the
exclusive Newcomer process for
reclaiming carbide

Save up to 50% of the "Package Prices" of regular carbide grades!

Newcomer Products, Inc., through more than two years of research, has developed a revolutionary method of refining reclaimed carbide and processing a percentage of it into a quality, low-cost, general purpose carbide—**NEWPRO**! This new cutting material, produced in volume, answers the need for a general purpose carbide which will meet many of your bulk production requirements, yet promote increased profits through its drastic, low initial cost.

Of course, where maximum cutting efficiency is necessary, we recommend continued use of superior Newcomer Controlled Quality Standard Carbide grades. However, **NEWPRO** has been thoroughly field-tested for performance and reliability! Set up your own general test program ... then compare the performance and initial cost factors of **NEWPRO** with your present general purpose carbide grades.



Keep profitable production on the go...
with the new economy carbide NEWPRO!

NEWCOMER PRODUCTS, INC.

PLANT AT LATROBE, PA.

KEystone 7-5531

TWX: LAT 871

General Sales Office: 512 FRANKLIN AVE., PITTSBURGH 21, PA.

Call: CHurchill 1-4060

Sales Offices Located in Principal Cities

For more data circle 395 on Postpaid Card

June, 1958

modern machine shop 99



"Government officials are beginning to recognize this new situation, but they are a long way as yet from giving it realistic consideration in their tax decisions. Neither are they recognizing that it takes far more money to buy the new machines than it did to buy the ones they replace," he added.

Colbert said that other countries of the world have discovered they can speed industrial growth by gearing their tax policies on depreciation to the realities of twentieth-century technology.

"In the United States we have been making only very modest progress in the use of realistic depreciation policies to provide incentive for industrial expansion and modernization. We still have a long way to go," he said.

Pointing out that removal or drastic reduction of the federal automotive excise tax would serve to stimulate the nation's business, Colbert said:

"It makes no more sense for the federal government to tax a man for buying a new car than it would to tax him for buying a new house."

One out of every six businesses and one out of every seven workers in the United States are directly dependent upon the manufacture, distribution, servicing and use of motor vehicles, the Chrysler Corporation president said.

"It is of the greatest importance that the reduction of the federal

excise tax be made on all new cars now in dealers' stocks and that protection be given new-car purchasers between now and the enactment date of a new excise-tax law," he stressed.

In urging taxation that is an incentive to progress, Colbert said:

"The basic truth is that the main source of our strength lies in the will and the imagination of free individuals working creatively and cooperatively with other free individuals. And it is by remembering that truth and using it as the guide to our thinking and planning that we will realize our great promise as a people."

★ modern machine shop ★

EXHIBIT IN CLEVELAND

An exhibition and demonstration of 60 latest design machine tools by 19 machine tool builders represented by the Distributor Division of The Motch and Merryweather Machinery Company will be held by this company at its recently completed plant at 1250 East 222nd Street, Cleveland, Ohio, from June 3 through June 7. In addition, 14 manufacturers represented by the Allied Products Division of Motch and Merryweather will display machine tool accessories, inspection equipment, cutting tools, and so on.

A number of machines will be introduced and shown for the first time at this show, which will be open at 10:00 A.M. to 6:00 P.M. daily and on Thursday evening, June 5 until 9:00 P.M. Included will be machines performing about every type of metalworking operation.

ARMSTRONG WRENCHES

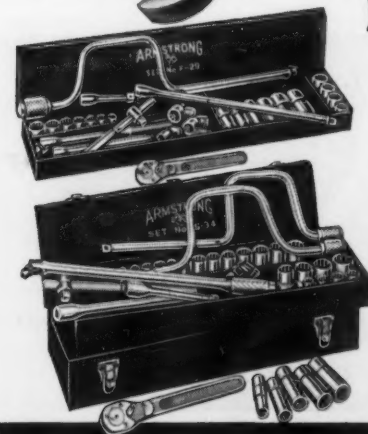


Choose Your Wrenches as you do your friends--for life

Specify ARMSTRONG Wrenches for lifetime service, for finely balanced tools that feel right in the hand and make work easier, faster and less fatiguing. ARMSTRONG Wrenches generally are longer for size—give greater leverage. Accurately milled or broached openings give the proper clearance. They are safe wrenches because they are strong beyond need.

Drop forged and machined from high tensile carbon or special alloy tool steels, ARMSTRONG Wrenches are heat treated, tempered and tested to an exact balance of toughness, hardness and tensile strength. Each is beautiful in finish and line, is a quality tool to be proudly possessed by any mechanic—or certain to "give a lift" to any assembly line. Buy wrenches which carry the trade marks HI-TEN or ARMALLOY. On carbon or alloy steel wrenches these trade marks are your guarantee of lifetime quality.

WRITE FOR CATALOG



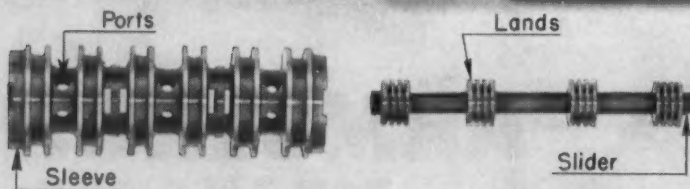
ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"
5228 W. ARMSTRONG AVENUE CHICAGO 30, ILL.

For more data circle 396 on Postpaid Card

June, 1958

modern machine shop 101



"Packaged Precision" Accelerates Servo Valve Production

Judicious selection and arrangement of standard machine tools and gages provides for precise manufacture of valve parts.

By LOUIS H. DOERMAN
Assistant Editor, Modern Machine Shop

Increasing automation, increasing complexity of aircraft guidance systems and the era of the missile, all have served to give an increasingly important role to servomechanisms, the most important component of which is the ser-

vo valve. Used to regulate the flow of fluids within the servosystem, these valves play a critical role in the sensing and control mechanisms which are the function of the system. Operating at pressures up to 3,000 p.s.i. in applications where re-

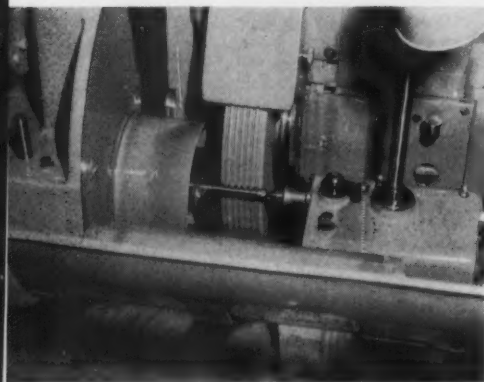


Fig. 1—Blanks are plunge-ground to form the slider lands and grooves prior to a finish O.D. grind, under precision control.

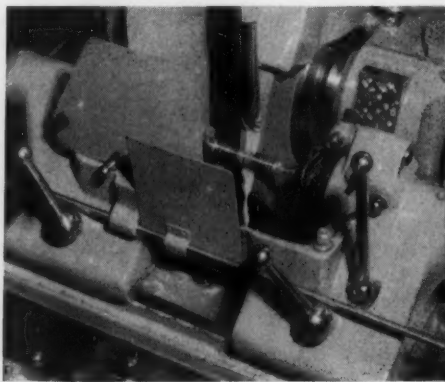


Fig. 2 — A cylindrical grinder is shown performing the finish O.D. grind on the slider "O" rings to within 0.0001 inch.

action must be instantaneous, there is little room for mechanical tolerances. So accurate must be the fit between slider and sleeve that they are generally mated and therefore not interchangeable.

The Sheffield Corporation of Dayton, Ohio, long associated with gages and precision measurement, has developed a "Servo Package" composed of all standard equipment, designed to accomplish the precise manufacture of these valves. In a recent demonstration a sample valve was produced on this line. Operations involved grinding, electrical discharge and ultrasonic machining, gaging, match grinding and ultrasonic cleaning.

The sleeve and slider manufactured on equipment of the Servo Package and described in this article are made from S.A.E. 52 100 steel, hardened to 57-60 on the Rockwell C scale. Starting from the blank, the slider is first formed on a Model 109 Precision Annular Form Grinder by the Crushtone method, which plunge grinds in one pass, six "O" rings on the blank in 3 minutes 15 seconds as illustrated in Fig. 1. The rings must be accurately placed within 0.002 inch and the grooves within 0.001 inch. The depth of feed is 0.145 inch. In this one operation everything but the O.D. is ground.

Following this, accuracy of part form was inspected on an optical comparator and recess of undercut diameters were checked with limit-type gages. A Precisionaire gage with an Airetest indicator checked the concentricity of "O" ring groove diameters with sleeve bore.

The next operation rough grinds

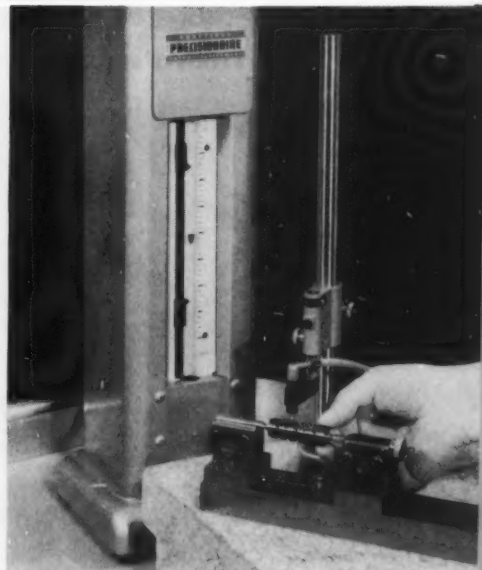


Fig. 3—Extremely precise control must be maintained on the matching O.D. of the slider lands and the I.D. of the sleeve.

the O.D. on a Matrix 1-A Cylindrical Grinder, after which the piece is sent to heat treat for stress relief. After heat treating the finish O.D. is ground, also on the Model 1-A with a 0.0001 inch tolerance.

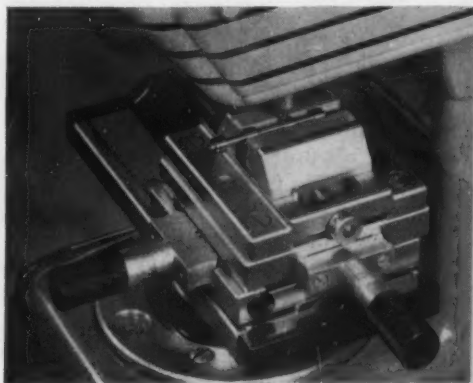


Fig. 4—The hardness of the slider land is checked by nondestructive methods to assure that it is of the specified strength.

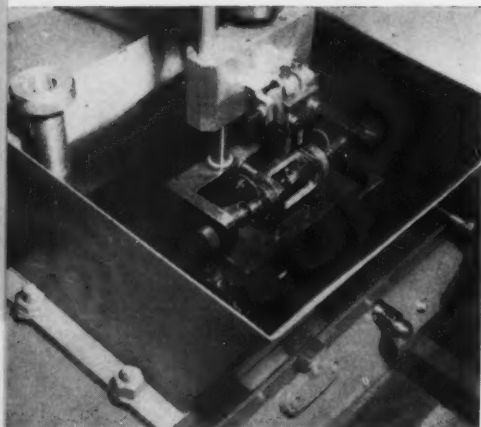


Fig. 5—The parts are rough-formed into the sleeve workpiece by electro-discharge machining in about two minutes per port.

Roundness and straightness are held within 25 millionths of an inch. About 0.0005 inch of material is removed in this grind, shown in Fig. 2.

A similar sequence of operations on the same machines, prepares the sleeve from the blank which has been previously bored and lapped. Each step of these particular operations is accompanied by precise gaging. Two types of Precisionaire size control gages were used on the 1-A grinders. One machine was equipped with a pneumatic Plunjet pickup unit attached to the wheel-head slide to indicate stock removal as the wheel was fed into the work. The other machine had a Precisionaire In-Process caliper type gage which continuously measures the work during grinding. Concentricity of slider O.D. and sleeve bore was checked with a Precisionaire gage with Plunjet tooling as illustrated in Fig. 3, while slider taper and straightness was checked with an

Accutron electronic comparator to ten millionths of an inch accuracies. Hardness of the lands on the slider is checked 0.001 inch from the edge of the land on a non-destructive MicroHardness Tester as shown in Fig. 4.

In the next operation ports are machined into the sleeves. This is accomplished by roughing them in on a Model 500-ED Electric Discharge Machine as shown in Fig. 5. The ports are roughed to within 0.007-0.008 inch of finish size. Four series of four ports each located at 90 degree intervals, are formed in about 32 minutes for the entire job.

Next the ports are finished on a Model 1000-C2 Cavitron Ultrasonic machine as illustrated in Fig. 6. Here tolerances are tight. Port edge location must be within 0.002 inch from the portage end of the sleeve. Size must be accurate within 0.005



Fig. 6—The roughed-in parts are finished within tolerance by means of this ultrasonic machine in one and one half hours.

inch on the long dimension of 0.156 inch and 0.002 inch on the short dimension of 0.056 inch. In addition each port must be radially aligned with the others within 0.0002 inch on the diameter. A total time for this operation averages about one hour and thirty minutes.

A micro-visual inspection is now made of the entry of the ports on the sleeve using a thirty power microscope as shown in Fig. 7. After inspection the parts are ultrasonically cleaned and selectively gaged for match grinding.

The matched pairs of sliders and sleeves having been selected for assembly are now fixed into a Model 121-C Optical Match Grinder, illustrated in Fig. 8, to final grind the slider lands so that there is a predetermined amount of overlap with the sleeve ports. In this final grind approximately 0.0001 inch of

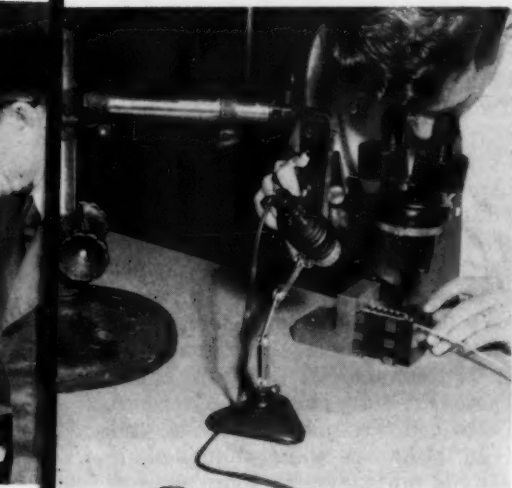


Fig. 7—Finished parts are subjected to a micro-visual inspection to assure a proper entry of the port into the sleeve bore.

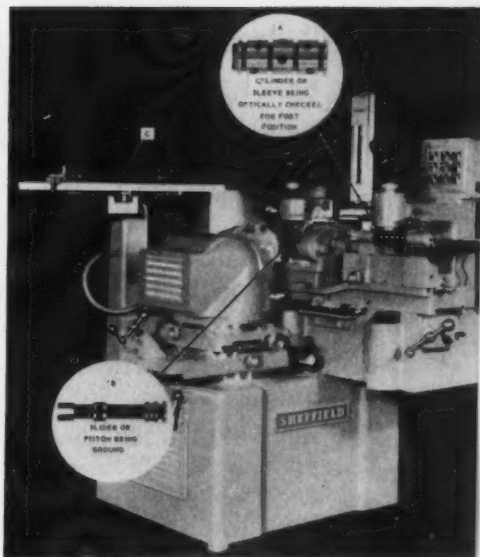


Fig. 8—After approximately matching parts are selected, they are ground to an exact mate-match on this Optical Match Grinder.

material is removed in about ten minutes.

The parts are assembled and subjected to a flow test. The relationship of the edge of the land to the inside edge of the port is critical in governing hydraulic flow through the ports. Too much overlap (when the land extends too far past the port edge) causes lag in response, while the opposite fault causes fluid leakage which may result in slow or incomplete control action. If there is any excess stock on the slider land in relation to the sleeve port, it is removed on the Model 121-C or 123 MicroForm Grinder.

Thus, by combining-accurate machining, careful gaging and precise control, does the Sheffield Corporation offer a "Package" for the quality production of servo valves.

HEAT TREATING

SHOULD YOU DO IT YOURSELF?

Several important factors which manufacturers should consider in deciding whether to do their own heat treating or sub-contract it are discussed.

By A. S. EVES

Perfection Tool and Metal Heat Treating Company

This is a free country. So any manufacturer, large or small, may decide for himself whether to do his heat treating under his own roof or sub-contract it. *It is interesting how widely different are the opinions on this, for no apparent reason.* In an industrial community one may find, say, four plants all very much alike in size and product but each having a different viewpoint:

Plant A heat treats its production parts, but sends out tools.

Plant B hardens its own tools, but sub-contracts production.

Plant C has no heat treating facilities, so sends out everything.

Plant D does its own hardening—perhaps also some hardening for neighbors.

Now, to operate a private heat treating department may seem feasible enough at first glance. After all, no great mystery is involved; it merely calls for the right equip-

ment, plus know-how. The more suitable the apparatus, and the greater the skill, the more pleasing and profitable are the results. It's as simple as that.

Indeed, it may look downright inviting under certain conditions. Two of these are: (a) where there is no commercial heat treater near by, and (b) when the work to be done is so uniform in nature, so repetitive, and in such large volume that no one else could do it cheaper, faster, or better.

However, getting all the necessary data together to decide whether to do such work at home or send it to a commercial job shop, is not easy. Obviously the first step would be to compare quality, service, and cost. However, these things alone are not quite enough; there are certain "sleepers" which should not be overlooked.

There are certain facts that

**"The commercial hardener actually saves money
by keeping his furnace up to heat."**

should be brought out into the open.

Fact 1. *The commercial heat treater's costs are low.*

Consider fuel; as a very large consumer of gas and electricity, he enjoys the very lowest rates per therm or kilowatt. A manufacturer may have to pay two or three times as much!

Moreover, the professional heat treater uses his furnaces 24 hours a day—many are kept hot 7 days a week. A manufacturer, on the contrary, seldom can use all his equipment continuously; so he suffers serious waste of fuel in warm-ups. Idle equipment never pays. Even shutting down over the week-end can be prohibitive. Besides, in treating certain steels unless one does operate around the clock he is bound to bump up against the time element.

Seldom does the heat treater run a furnace that isn't fully loaded. He serves many customers, and can very often combine jobs of identical composition without sacrificing quality, but at a distinct saving per pound.

Again, there always is a good deal of maintenance around a heat treating set-up. The commercial hardener, while as a rule employing more maintenance men, actually saves money by keeping his furnaces up to heat. For alternate heating and cooling increases the need for maintenance.

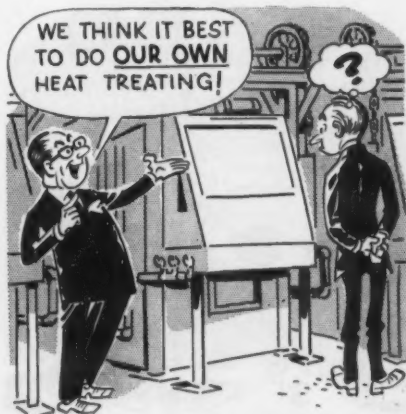
Finally, the overhead of a job

shop normally is lower — often as much as 50 percent.

Fact 2. *You can save money in other ways, too!*

A midwestern manufacturer of road machinery who for years had heat treated hundreds of parts under its own roof, awoke to the fact that its hardening room had gone to seed. Its furnaces were outmoded. Jobs kept bobbing up that they just wouldn't handle. So more and more work had been going out to commercial hardeners — more, in fact, than was being done at home.

To replace the obsolete furnaces at \$30,000 or more apiece would amount to a staggering sum. Other equipment would be needed for new techniques. More floor space would be required, and that was already at a premium. They would have to



"It is interesting how different are the opinions on this, for no apparent reason."

"Much work turned out in commercial heat treating plants is scale-free . . . you can omit a final grinding operation."

hire more skilled help, and good heat treaters are scarce. So they shut down the department complete, and now send *all* such work out.

What was the result?

Better work—at less cost, in addition to some wholly unexpected benefits.

Hardnesses proved to be more uniform. There was far less tool breakage than before. Dirt and scale vanished from the scene. Shafts were less distorted, so the saving in grinding helped to pay the nominal heat treating charges. Tools treated by the experts worked better and lasted longer. Knotty problems of various sorts were solved in pleasing fashion.

The management now freely admits that the change-over should have been made sooner. An in-plant

operation *can*, in fact, be quite an extravagance.

Obsolescence of equipment is not the sole reason why manufacturers take a second look at their heat treat departments. In automobile plants, for instance, supplementary unemployment benefits tend to drive such work out into the open market. Being "self-contained" doesn't always pay.

Anyway, a manufacturer usually can best put floor space to use for those operations he is specially equipped and manned for. Here's why:

1. Fire insurance is lower when you don't do heat treating.
2. There's no need to tie up a wad of capital in apparatus.
3. You eliminate the cost of purchasing and storing heat treat supplies.
4. There is a reduced payroll, too.
5. Lack of skilled help can result in *spoiled* work — perhaps enough of it to pay for a lot of professional service.

Much work turned out in commercial heat treating plants today is scale-free. You perhaps can omit a final grinding operation.

Does the case of the road machinery firm strike you as exceptional? Then listen to what Mr. Ernest M. Olson, of the Rockwell Manufacturing Co. of Pittsburgh, wrote in a magazine serving the heat treating field. His firm, he reports, turned over its heat treating to a job shop and saved about 25 percent.



"Consider fuel; a manufacturer may have to pay two or three times as much!"

"New steels, new apparatus, new techniques appear so fast that it makes the professional dizzy trying to keep pace."

He goes on: "To have done otherwise would have involved the purchase of new equipment, more plant space, more insurance, higher maintenance costs, and hiring experienced help." . . . The consultation function of a good heat treating shop's highly trained metallurgists can be extended at no extra cost. . . . All in all, we feel the arrangement has worked out to our advantage all along the line."

Fact 3. *No private heat treat department ever is, or can be, quite complete.*

Quite a few firms sincerely believe their in-plant hardening rooms to be self-sufficient and complete. Perhaps that was true when they were first established; but if any such set-up is more than three or four years old, this is wrong.

For the art of heat treating has not stood still. Quite the contrary. New steels, new apparatus, new techniques appear so fast it even makes the professional dizzy trying to keep pace. *The manufacturer, quite understandably more interested in other phases of his business, is apt to miss some very good bets.*

Perhaps the quickest way to demonstrate is to list here operations that commercial heat treaters perform today:

Annealing, normalizing, stress relieving and spheroidizing, with or without special atmospheres or packing in sealed pots.

Tempering or drawing, with or without the use of jigs.

Heat treating of wide variety, with or without atmosphere control or in a vacuum. Includes rotary, continuous, localized heating using induction or flame machines or lead pot. Case hardening, with gas, liquid, or compound. Includes homogeneous carburizing; carbon restoration with control of carbon potential; nitriding; oxidizing aluminum; casing stainless; chrome diffusion; nitriding of high speed, and other types of work.

Martempering, austempering, isothermal treatment.

Cleaning: washing, degreasing, descaling, blasting, liquid honing and ultrasonic cleaning.

Testing: Rockwell, Brinell, scleroscope, Tukon and Magnaflux.



"A manufacturer awoke to the fact that its hardening room had gone to seed."

"... no heat treating department, private or commercial, can be anywhere near complete without also being elaborate."

Sub-zero treating: usually around minus 120 deg. F.

Shrink-fitting, using either heat or cold.

Press-quenching of gears and the like.

Hole-quenching of such items as header dies.

Steam treating for a wide variety of purposes, including tool improvement.

Brazing.

Coloring: blueing, and so on.

Shot peening to increase tensile.

There are more, but these will suffice for the moment. Not all commercial plants offer all services, but most of them miss it by a very narrow margin.

Increased performance standards are creating more heat treat work.

Parts that used to be left in a soft condition now are being hardened. Closer dimensional tolerances often force important changes in heat treating methods; for instance, some parts formerly given overall hardness now have their hardness confined to certain areas. That, of course, calls for something more than just a furnace.

Obviously, no heat treating department, private or commercial, can be anywhere near complete without also being elaborate. The common notion that a single job requires only a single furnace and a quench tank should be discarded. True, some of the big new furnaces perform more than one operation; but there are steels (high speed is one) where as many as five or six furnaces must be used. There are jobs that call for specially prepared atmospheres, such as hydrogen for bright hardening stainless. There are other jobs which are heated with special apparatus; induction and flame hardening for example. In fact there now is a stainless steel on the market which is best hardened, not with heat at all, but by *freezing!*

Duplicating a professional's facilities is seldom practical for a manufacturer. In any event, no matter how much he spends for a set-up, sooner or later comes a day...

(a) When he needs some certain treatment to which a commercial heat treater holds the *exclusive* rights.

Most job shops offer one or more



"The manufacturer, quite understandably more interested in other phases of his business, is apt to miss some very good bets."

"... the professional heat treater is in a spot where he must always keep ahead of the manufacturer."

proprietary treatments. Used correctly, they can be highly profitable. But most of them are not as well known as they should be—and of course one cannot benefit until he knows of them.

- (b) When his in-plant department suffers a breakdown, yet production schedules must be met.
- (c) When he has an overflow of heat treating work.
- (d) Or when orders fall off so badly it doesn't pay to light his own furnaces.

On my desk at this moment is a classified ad by a firm announcing "Idle capacity for treating 3,000 pounds of steel parts per hour." That is self-sufficiency backfiring.

- (e) When his product suddenly changes size, shape, or composition, and either suitable equipment or know-how is lacking.

In such cases, one of two things must happen. Either an increasing amount of work must be sub-contracted, or the manufacturer must try to "stretch" his old equipment. This last can have serious consequences.

Suppose you found yourself in need of brazing, steam treating, press-quenching, bright hardening, or sub-zero treating. Could your private set-up handle these?

- (f) When a governmental job calls for certification, and his equipment has not been formally approved.

- (g) When he visits a plant where similar work is being done cheaper and better.

This last is not a mirage. Most every commercial heat treater has been visited by an official from some factory who, after looking over the various operations, frankly stated that his own department did not and never could quite match what he had just seen.

There is a definite reason why. Fact is, the professional heat treater is in a spot where he *must* always keep *ahead* of the manufacturer. For if he should fail to do so, he would be limiting himself to mere overflow work or jobs from firms that have no heat treating equipment at all.

How long has it been since you



"... the professional heat treater offers some very important technical advantages—a furnace is not just a machine."

"... professional hardener keeps abreast of new developments through a trade association, publications and by research."

paid a visit to a modern heat treat firm?

Fact 4. Quality—A three lane highway.

Maybe it's natural for a manufacturer to assume that quality is best controlled when all his operations are performed at home. However, the professional heat treater offers some very important technical advantages—a furnace is not just a machine. For one thing, he has know-how or he has nothing.

Where would you seek men with the widest experience in this field? Why, in commercial heat treating plants, of course.

If with his superior apparatus, metallurgical training, and a broad daily experience the hardener can't equal the work of an in-plant department, he will not long remain in business. Quality is a three-lane highway, consisting of: the right equipment, the best process for each job, plus skill and long experience.

Every factory owner knows what it means to have available the right equipment, and the right men, at the right time.

For quality control, the commercial hardener usually will have a laboratory. Also a reference library containing steel specifications as well as textbooks on metallurgy and a complete file of steel analyses.

Moreover, today's professional hardener keeps abreast of new developments through a trade association, publications, and by research. The proof of quality lies in results.

Why not hand your local heat treater a trial lot of your parts—tell him of any problem you've had with them, then see what he comes up with.

Your own inspection department can continue to check quality, as it does now.

Fact 5. There are "extras" you can deduct.

As a customer of a professional heat treater you are unquestionably entitled to his expert metallurgical advice—free. Naturally he should not be expected to recommend steels by make and brand, that would be unethical. But he will gladly tell you the best type to use. He will explain the new techniques, and may be able to show you how you can eliminate some expensive op-



"As a customer of a professional heat treater you are unquestionably entitled to his expert metallurgical advice — free."

erations such as straightening, pickling, or final grinding. He will give you a wide choice of treatments to meet precise needs.

You will avoid any need for governmental approval of your set-up.

You will avoid some possible labor problems.

You will get rid of a lot of heat,

dust, smoke, dirt, and fumes.

You may avoid use of poisons such as cyanide.

You'll probably wind up with an improved product!

Find Your Own Costs

Management, while interested in quality and service, must keep a sharp eye on costs. Presented here-

Table Listing Investment Items for Heat Treating

FURNACES:

- Car type
- Box type
- Continuous
- Reciprocating
- Mechanized batch
- Pit type
- Pot type
- Rotary
- Vacuum
- Tempering

GENERATORS: (Atmosphere)

CONTROLS:

- Pyrometers
- Regulators

QUENCHING EQUIPMENT:

- Tanks
- Cooling coils
- Die-quench machine
- Hole-quench device
- Flat bed press

SPECIAL EQUIPMENT:

- Flame hardening
- Induction
- Steam treating
- Sub-zero treating

CLEANING EQUIPMENT:

- Degreasing
- Washing
- Blasting
- Liquid honing

CLEANING EQUIPMENT (Cont'd.)

- Tumbling
- Ultrasonic
- Descaling

STRAIGHTENING PRESSES

TESTING EQUIPMENT:

- Rockwell
- Scleroscope
- Brinell
- Tukon
- Portables
- Magnaflux

LABORATORY EQUIPMENT

MISCELLANEOUS:

- Cranes and hoists
- Floor trucks
- Motors
- Fans
- Pumps
- Dust collectors
- Gages
- Screens
- Alloy pots and baskets
- Grinders
- Benches
- Tongs and small tools
- Clamps and jigs
- Other

Table Listing Expense of Performing Heat Treating Operations

INTEREST on investment	MISC. SUPPLIES:
LABOR (direct)	Carburizing compound
SUPERVISION	Gases
RENTAL (floor space)	Salts (cyanide, etc.)
DEPRECIATION	Lead
EXTRA FIRE INSURANCE	Grit and shot
FUELS:	Charcoal, pitchcoke
oil	Cast iron chips
gas	Sand
electricity	Sawdust
QUENCHING OIL	Ammonia
WATER	Other chemicals
MAINTENANCE (of all equipment)	
OUTSIDE INSPECTION (of pyrometers and testing machines)	
TAXES (personal property)	
ALLOWANCE for spoiled work \$.....	

with are two tables that should help. One of these tables lists the Investment items, the other table lists the Expense. Follow these and

make sure no element is omitted. Then when your own costs are determined, get quotations from a commercial hardener. Seeing is believing.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Way Grinder Has 48 x 36 x 240-Inch Work Area

A huge surface grinder with a work area of 48 x 36 x 240 inches has been recently acquired by the Landis Tool Company for grinding the ways of large machine tools. Designed and built by the Thompson Grinder Company, the machine has several interesting features.

To meet the demand for the posi-

tive, fast and accurate vertical travel specified by the job requirements, an unusual design was incorporated in this grinder in the form of anti-friction, recirculating ball nuts. The use of these ball nuts reduces friction between nut and screw to a minimum; positions the rail more accurately, without counterbalancing, and also extends the life of the screws indefinitely.

Another new feature is found in the design of the way bearings for

the transverse travel of the horizontal and vertical wheel heads. Here, a recirculating roller chain, contacting hardened and ground v ways, provides increased accuracy and more positive transverse movement.

The machine is also equipped with a Hydra-Cool hydraulic system which, by reducing hydraulic heat to a minimum, eliminates heat distortion throughout the machine. An accuracy within 0.0007 inch can be held over the work area under production conditions.

The horizontal wheel head provides 40 horsepower, and uses a 24 x 6 x 12-inch grinding wheel with a 1,200 r.p.m. speed. The vertical head has an inclinable spindle and provides 10 h.p. with a 12 x 3 x 5 inch grinding wheel at either 1,800 or 3,600 r.p.m. The machine can be operated from either side by dual manual controls and a pendant electrical control station. Wheel truing

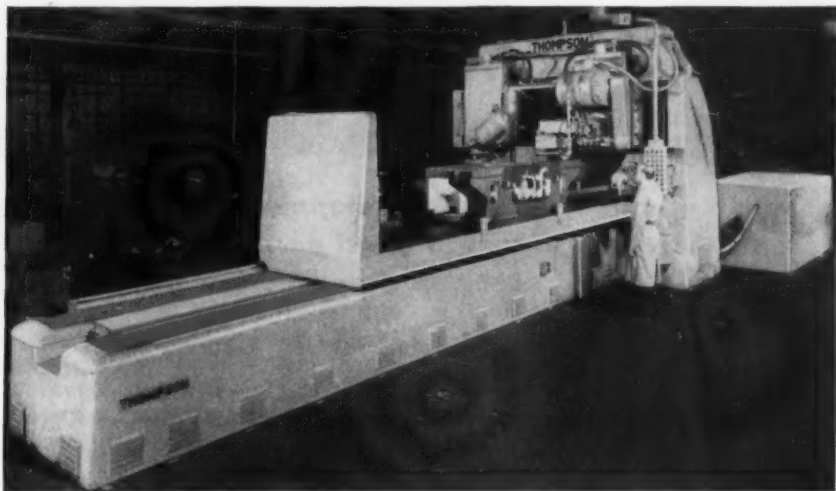
is furnished by a head-mounted 90-degree included angle device for the horizontal head.

The columns of this machine are keyed and bolted to generous bearing pads on the machine bed with a heavy bridge casting tying the two columns together at the top. This structural design assures maintenance of the initial alignment and constant accuracy of the columns and rail assembly. The machine is equipped with dual packless cylinders. The table is supported on large vee and flat ways and is pressure lubricated by an oil system divorced from the hydraulic system.

Failure of oil pressure to the table ways prevents hydraulic operation of the table. All bed ways and vertical ways are completely covered.

The machine weighs 80 tons, is 13 feet wide and 13 feet high and has an overall length of 52 $\frac{3}{4}$ feet.

For more data circle 70 on Postpaid Card



Thompson 48 x 36 x 240-Inch Grinder used by Landis Tool for grinding machine tool ways.

Production Grinding Parts To Millionths



Here is an important new development which enables semi-skilled operators to grind parts to extremely close tolerances on production basis.

By BARTLETT WEST

THE PROBLEM . . . Aware that grinding machine operators capable of grinding parts to limits of plus or minus ten millionths (0.000010 inch) are exceedingly scarce, Brown & Sharpe development engineers

sought a solution to this important problem. Also aware that parts finished to such precise dimensions are usually required to fit equally accurate holes, the problem of super-accurate external grinding and mat-

(Left)
Sharp
ped v
of p

ing
prob

It
part
roun
size
lion
the
ing
dica
ishe
the
be
ed t
emp
hole
mou
tinu
bein
tron
ed
cuit
ly i
of t
wid
wor
cou
with
allo
elim
fini
rou
requ

T
ing
basi
Grin
stoc
dev

Jun

(Left) This illustration shows a Brown & Sharpe No. 5 Plain Grinding Machine equipped with "Ceda Size," which provides a means of producing and controlling an extremely

fine cross feed. An electronic comparator caliper gage "rides" on the work and an amplifier registers changes in work diameter in increments of a few millionths of an inch.

★ ★ ★ ★ ★

ing was considered to be a single problem.

It was determined that if small parts could be cylindrically ground round and straight and to a given size within plus or minus ten millionths (0.000010 inch), sizing from the work diameter with a work-riding caliper and an amplifier to indicate when the work reaches finished size, then a big step toward the solution of this problem would be made. It was further determined that if an internal gage could be employed to measure the size of the hole, and an external caliper gage mounted on the machine to continuously check the size of the part being ground, both to be of the electronic strain gage type and connected through a differential-type circuit, an amplifier could continuously indicate the actual size difference of the two parts on a dial having wide spaced graduations. In other words, pistons, plungers, and so on, could be ground to precisely mate with cylinders, thus opening up the allowable size tolerance of bores and eliminating this costly element in finishing holes. Straightness and roundness, of course, would still be required.

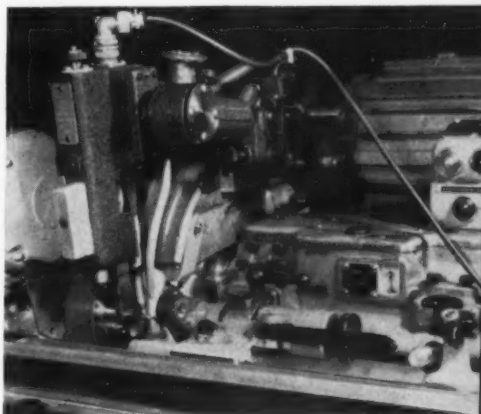
THE SOLUTION . . . The foregoing conclusions have resulted in a basic Brown & Sharpe No. 5 Plain Grinding Machine combined with stock equipment and two recently developed B&S units that will en-

able a semi-skilled operator to accomplish the following:

1. Plunge grind a group of suitable parts to any predetermined size within plus or minus ten millionths (0.000010 inch).

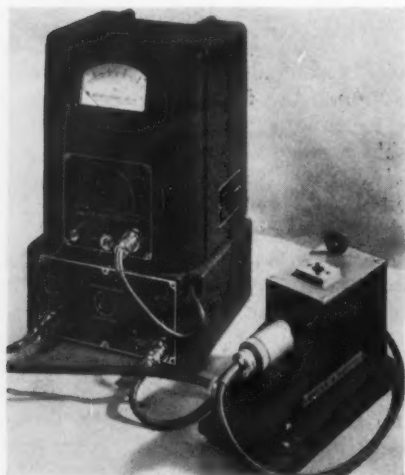
2. Plunge grind a group of suitable parts to any predetermined fit in a group of mating holes within plus or minus twenty millionths (0.000020 inch), without making individual measurements and calculations, and even though the holes may vary in size by two ten thousandths (0.0002 inch).

3. Perform fitting or finishing operations on a group of similar parts, removing as little as ten millionths (0.000010 inch) stock or up to two



Close-up view of electronic caliper gage, which "rides" the work while changes in diameter are indicated in ten millionths of an inch by means of an amplifier (not shown).

"Parts may be replaced in the machine where as little as ten millionths can be removed from the diameter."



"Electromate" is combined with "Ceda Size" when it is desired to grind pistons to mate with bores within precise clearance limits.

ten thousandths (0.002 inch) from each piece within an accuracy of plus or minus ten millionths (0.000010 inch). Once the setup is made, the amount of stock removed from each part can be varied within the above limits, depending upon individual part requirements.

4. Parts may be taken from the machine, measured, and replaced in the machine where as little as ten millionths (0.000010 inch) can be removed from the diameter.

THE RESULTS . . . The results described are obtained with a No. 5 Plain Grinding Machine having all alignments reduced to an objective of "O," and having special carbide-tipped centers. The machine is fitted

with Electralign to insure easy, accurate control of taper. Setting the machine on isolation mountings, of the tempered spring type, protect it from external vibrations. Means are also provided for filtering the coolant and maintaining it at room temperature.

This machine is also equipped with a wheel slide rapid travel arrangement and an automatic cycle and spark timing arrangement and continuous in-feed for plunge-cut grinding. However, if the parts are round and straight with carefully lapped center holes and come to the machine within two to three tenths (0.0002 to 0.0003 inch) of finished size, the automatic cycle and spark timing arrangement is unnecessary. Also contributing to the amazing results obtained with this machine are the newly developed Brown & Sharpe "Ceda Size" and "Electromate."

"Ceda Size" is a means of producing and controlling an extremely fine cross feed, with an electronic comparator caliper gage riding on the work, and an amplifier registering changes in work diameter in increments of a few millionths of an inch. Wide spaced graduations in increments of ten millionths (0.000010 inch) on the amplifier scale make small changes in work diameter easy to observe.

The "Electromate" attachment is combined with "Ceda Size" when it is desired to grind pistons to mate with bores within precise clearance

limit
mate
unit
ampl
liary
be us
to 1
meas

★

En
and
Publ
Die
1, M
inch
\$1.5
TL
ough
twice
a lar
deta

Tem
in C
S
larg
show
rupt
at th
land
of p
inch
ter
ceiv
tion
gear
bala
ing
form
4A
For

limits. Included with the "Electromate" is a "Computer-Selector" unit on which the "Ceda Size" amplifier is mounted, and an "Auxiliary" or bore gage. This gage can be used to measure bores from 3/16 to 1 inch in diameter with suitable measuring points for each job.

★ modern machine shop ★

Engineering Data on Thread and Form Rolling. Third Edition. Published by Reed Rolled Thread Die Co., P. O. Box 350, Worcester 1, Mass.; 87 pages; page 8½ by 11 inches. Paper, staple bound. Price, \$1.50 per copy.

The third edition has been thoroughly revised and enlarged to twice its previous length. Covering a larger area the treatment is more detailed than in the second edition.

This book remains a reference in its entirety, not having been designed for an evening's reading.

Following a very brief discussion of the thread rolling process together with its advantages and disadvantages, the treatment proceeds directly to all manner of engineering data concerning threads, knurls, splines and serrations.

There follows a thorough discussion of the rollability of materials complete with summary tables. Complete treatment is given blank specifications and equipment and tools for producing rolled threads as well as a section on prolonging roll and die life.

Operators' check lists for thread rolling and automatic screw machines are alone worth the price of the book. Reference tables fill out the material presented in the book.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Ten Machining Operations in One Chucking

Segmented master gear for a large hospital X-ray machine is shown herewith receiving an interrupted facing cut during machining at the Ohio Gear Company, Cleveland, Ohio. Requiring an accuracy of plus 0.001 inch and minus 0.000 inch, this difficult 25¼-inch diameter Refax cast iron workpiece receives 10 separate machining operations in only one chucking. The gear is held in a special counter-balanced clamping fixture. Machining with carbide tooling is performed on a Warner and Swasey 4A turret lathe.

For more data circle 71 on Postpaid Card



With the gear producing setup shown in this illustration, 10 separate machining operations are possible in one workpiece chucking.

How to Set Up an Efficient Lubrication System

Changes in design of equipment and in formulation of lubricating materials make it imperative to periodically review lubrication methods.

By F. A. KELLNER

Head, Central Machine Shop,
Bonded Abrasives Division, The Carborundum Company

Lubrication in a modern machine shop has come a long way since the days of the man with the "squirt can" and the open can of grease who went around at intervals to apply one or the other as the spirit and the available supply moved him. In spite of the bewildering variety of lubricants which are now available, however, setting up a well-planned system of checking, adding, and changing lubricants to conform to the manufacturer's specifications is neither expensive nor difficult. It more than repays its cost in reduced down time and lower maintenance.

Lubrication maintenance can be set up by an engineer or foreman so that one man with a minimum amount of mechanical knowledge can take care of the lubrication needs of a good-sized shop. In most instances, generally, only a portion of his working day will be required for lubrication, leaving the rest of the day for chip removal, stock cutting, running errands, and similar routine tasks. Such a combination of duties, however, warrants only a

less skilled or older employee, with the result that men are likely to be moving into and out of the job frequently. This means that the system must be simple and easy to follow, requiring a minimum of instruction from the supervisor, who is preferably either the shop foreman or an engineer.

It should be noted in passing that the lubrication of electric motors is preferably assigned to electricians or someone familiar with motors, because an over-generous feeding of oil or grease can cause damage.

Lubrication Specifications

The first thing to consider in setting up the system is to make sure that the shop lubrication specifications are up-to-date. The specifications are generally found in the shop's machine maintenance manual. It is often advisable to write to the manufacturers of the machines for their most recent specifications, because improvements and new types of oils since the time when a given machine was manufactured may have made the original specifi-

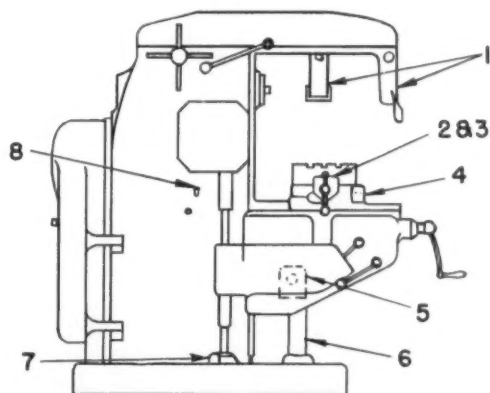
cation
er m
not
in th
main

Fig.
data

Jun

cations obsolete. For example, older machines with sliding ways may not have way lubricating oil listed in the original specifications of the maintenance manual. Or the original

specifications of a grinding machine having rotating spindles or shafts may call for a grease having good waterproof qualities. The grease originally recommended, however,



INTERVAL	POINT LOCATION	PARTS LUBRICATED	LUBRICANT SPECIFICATIONS
TWICE DAILY 8-HOUR DAY	2 & 3	LEAD SCREW BEARINGS	HARMONY 53
ONCE DAILY 8-HOUR DAY		CROSS FEED SCREW	
WHEN OIL LEVEL RECEDES LOW LIMIT	1	ARBOR BEARING COLLAR	
WHEN OIL LEVEL REACHES LOW LIMIT	4	BEARINGS IN TABLE & SADDLE	GULFWAY 52
	5	BEARINGS IN KNEE & FEED BOX	
ONCE MONTHLY	7	PUMP SHAFT BEARING	HARMONY 53
DRAIN & REFILL TWICE YEARLY REPLENISH WHEN LOW LIMIT IS REACHED	8	ALL BEARINGS & GEARS IN COLUMN TRANSMISSION	
REFILL TWICE YEARLY	6	VERTICAL SCREW	GULFWAY 75

Fig. 1—Sample lubrication specifications card showing method of listing important data as well as a sketch of the machine indicating points requiring lubrication.

"... be sure that any of the machines repaired will have proper lubricants selected for modified replacement parts."

DATE	PARTS LUBRICATED	TYPE OF LUBRICANT	OPERATOR
26 Feb.	Arbor bearing, Collor	Harmony 53	CVM
18 Mar.	Pump shaft bearing	Gulfway 52	CVM
29 Mar.	All bearings & gears		
	in Column Transmission	Harmony 53	CVM

Fig. 2—Back side of the lubrication specifications card shown in Fig. 1, provides adequate space for recording pertinent data when lubrication is checked or changed.

may be inferior to a modern lithium based E.P. grease that has both waterproof and extreme pressure characteristics.

A word of caution at this point is advisable. As specifications of machines are being reviewed to determine proper lubricants, be sure that any of the machines that have been repaired or reconditioned will have proper lubricants selected for modified replacement parts. For example, an original piece of machinery may have had sleeve bearings in a specific sub-assembly and may have required grease for the lubricant. A recently installed replacement for this sub-assembly may have ball or roller bearings and require oil for a lubricant. Incorrect recommendation of grease for the new sub-assembly could cause the bearings to run too hot and result in possible bearing failure.

Selection of Lubricants

Following the establishment of the lubrication specifications is the selection of oils and other lubricants to meet the specifications. At this

point it may be advisable to call in an oil company's lubrication engineer. Not only can he advise the best lubricant to meet the specifications, but he can also make a survey of oil and grease requirements for applications on which no manufacturer's specification is available. Most oil companies do not charge for this service.

Reducing the number of suppliers to a minimum consistent with good purchasing practice is a good way to reduce the possibility of confusion in purchasing, storing and selection of lubricants. It is also advisable to consider purchasing better grades of lubricants in order to have one which will take the place of two or three different grades. The decision on such a substitution, of course, depends on the cost of the superior grade and amounts to be used as against the savings from elimination of storage and transportation of the additional lubricants.

Lubrication Record Cards

After the specifications have been established and the types of lubri-

cants selected, a card, as shown in Fig. 1, should be made out in duplicate for each machine, showing full information as to the type of oil or grease to be applied at each point of lubrication, and the intervals at which oils in the reservoirs should be changed. The back of the card, as shown in Fig. 2, should contain spaces to record the lubrications and the oil changes as they are made with the exception of work performed daily or weekly. The original of the record card should be attached, preferably in a protective transparent cover, near the master switch of each machine. The duplicate card should be filed in the foreman's office, or in the permanent record file for each machine. For some machines it may also be advisable to have a sketch of the lubrication points and the types of lubricants used, as depicted in Fig. 1.

Be sure that any changes in the type of lubricant to be used are recorded both on the cards and in the machine's maintenance manual.

Storage and Handling of Lubricants

Storage of oil and grease drums should be confined to a separate fireproof area away from the shop. This not only conforms to fire underwriters' requirements, but also permits closer control over inventory and replenishment. All drums of material should be properly and clearly identified with name plates or tags.

The delivery of lubricants from the storage room to the machines is best made with a lubrication cart, as shown in Fig. 3. These carts are available from industrial lubrication equipment manufacturers. The cart shown in the illustration was pur-

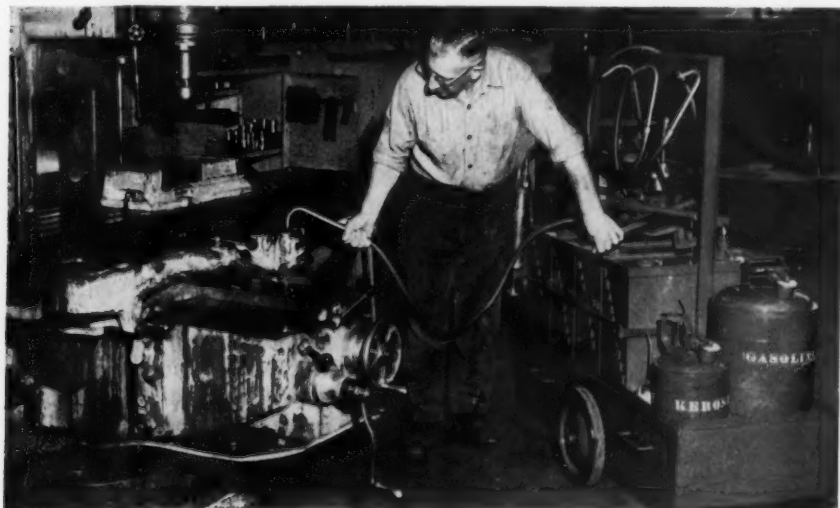


Fig. 3—Delivery of lubricants from storage room to machine is made best by cart.

Lubrication System . . .

chased from one of these manufacturers and modified to suit our needs. Its cost of \$500 has been more than justified by the reduction in time consumed in trips to the storage area for additional oils.

It is important that the covered containers on the cart hold enough lubricants for an average day's supply for the shop. This feature will greatly reduce trips for reloading.

Operating Procedure

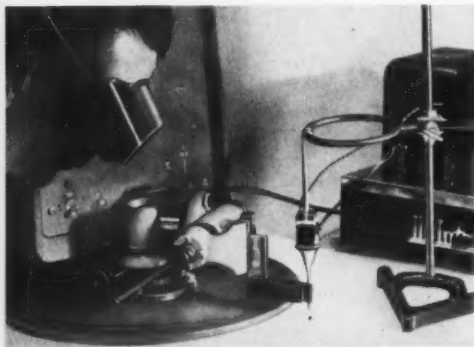
The lubrication man should be instructed to visit each machine daily on his route, and to follow the instructions on the card or machine outline. He should also be told to record on the back of the card the draining and refilling of oils, together with any lubrication that is scheduled on a cycle longer than once a day or once a week. Daily or weekly oiling and greasing need

not be recorded. Whenever an oil change requires more oil than the lubrication cart carries, the lubrication man should arrange to have a drum of the required oil moved to the machine. Any oil that is drained from a machine should immediately be put into a used oil container. The man should be cautioned to report promptly any oil leaks or other unusual conditions that he may notice on any of the machines.

Beyond this, the only requirement for a smooth-running system that will reduce machine down-time and maintenance costs is an occasional check-up by the supervisor to see that the lubrication man is following instruction cards properly.

The system described here was set up in our tool shop about two years ago and has been functioning very well. We find the instruction cards are easily understood by the lubrication attendant and this system has resulted in a substantial saving of maintenance man-hours.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

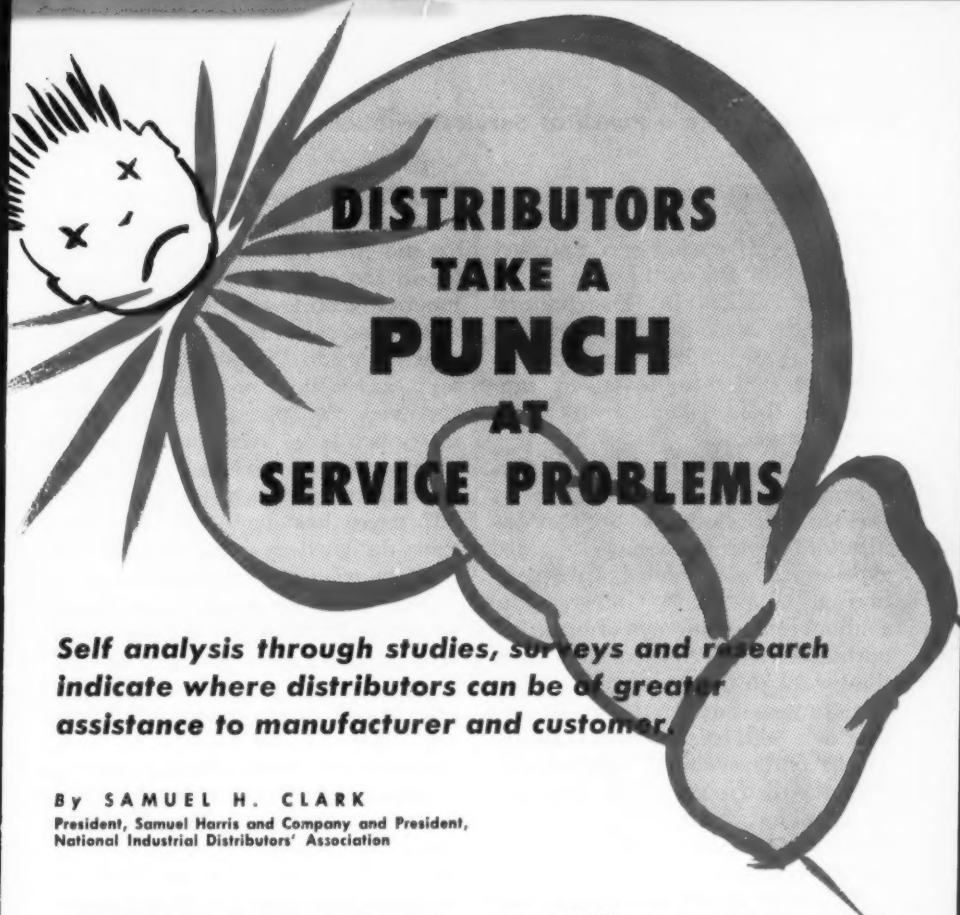


Research lab analyst is shown watching tiny-hole drilling operation with an Edroy Magni-Focuser, a binocular type magnifier that provides greatly magnified vision in 3-D.

Hair-Size Drilling Operation

An ultrasonic drill with a frequency of 28,000 cycles a second uses silent "sound" waves to bore precise holes measuring five thousandths of an inch in extremely tough materials. The drill was devised for precision missile work by Lockheed Missile Division's senior scientist. The accompanying illustration shows the manner in which the ultrasonic drill is set up in order to perform the rather unusual drilling operation.

For more data circle 72 on Postpaid Card



DISTRIBUTORS TAKE A PUNCH AT SERVICE PROBLEMS

Self analysis through studies, surveys and research indicate where distributors can be of greater assistance to manufacturer and customer.

By SAMUEL H. CLARK

President, Samuel Harris and Company and President,
National Industrial Distributors' Association

Service to customers has always been the foundation upon which industrial distributors have built their individual businesses. Today, this idea of service has become increasingly important and will undoubtedly continue to be the keystone of all activities of distributors. Their ambition is to make their service better and serve the needs of their customers with increased speed and efficiency and at lower cost.

While emphasis is being placed on the needs of the customer, distributors are not overlooking their

responsibility to manufacturers who depend upon them to distribute their products. Consequently, the word "service" implies a dual responsibility; i.e., responsibility to provide customers with the tools, production equipment, maintenance, repair and operating supplies when they are wanted and at the same time, function as the sales and distributing outlets for manufacturers.

At no previous time in the history of the industry have distributors combined and pooled their interests to such an extent to improve their operations as has been witnessed

Distributors Take a Punch at Service Problems . . .

during the past few years and which will continue in the immediate future. This is being accomplished by united efforts on the part of the National Industrial Distributors' Association and the Southern Industrial Distributors' Association to sponsor a self-improvement program for their members which has several facets.

Bearing in mind that the distributors' prime objective is service to customers, the two distributor associations have retained experts on the problems of distribution at Ohio State University to conduct several surveys of basic importance. As the first consideration, they want to demonstrate to industrial buyers through these surveys that it is both efficient and economical to purchase their requirements from the distributor. They also wish to show that the facilities that have been created by distributors are adequate to service their needs.

This first report emanating from Ohio State, which is conducting its investigations and studies under the direct supervision of Dr. Theodore N. Beckman, a recognized expert and authority on distribution problems, will in some respects be preliminary to more exhaustive and detailed research studies which will follow and which will require possibly four or five years to conclude. In other words, the Ohio State program is looked upon as somewhat of a continuing program that will thoroughly examine the operations of the industry and also point the way to desirable improvements.

Of course, some work in this direction has already been sponsored by the Modern Methods Committee of the two associations in conjunction with George D. Wilkinson Associates, a firm of management consultants in Princeton, New Jersey. Mr. Wilkinson has personally surveyed the operations of some thirty-two large, medium and small distributors in various sections of the country and in a report of some 197 pages has made recommendations designed to assist distributors improve efficiency of operation.

Improved accounting practices to give distributors better control of costs have been recognized as a fundamental need and the two associations have already developed an improved *Standard Chart of Accounts* for accomplishing this.

While distributors recognize they have a responsibility to efficiently serve the manufacturers whose lines they handle, they also feel that the manufacturer has an obligation to provide an adequate gross margin which compensates them for the service they render. Whether or not certain lines can be handled profitably has been a contentious matter for many years but the associations are now working on a program to mathematically demonstrate whether any given line pays its own way or is handled at a loss.

Education also has become an important part in the distributor's efforts to improve the efficiency of his operations and for the past two years they have sponsored special management courses at Harvard

University. In addition, engineering courses with a major in industrial distribution are being offered students by Clarkson College of Technology, Western Michigan University, Bradley University and Texas A & M. At present, it is contemplated that management courses at Harvard will be renewed in 1960.

While service to customers is, as has been stated, a primary objective of all distributors of industrial supplies, they feel that manufacturers have a responsibility to distributors to help them maintain the kind of service that is expected of them. Otherwise stated, distributors want to feel that manufacturers regard them as something more than a customer to whom they sell their products for resale to industrial users. They want to regard the manufacturer-distributor relationship in terms of a team relationship and maintain that manufacturers can, without added cost to themselves, do things that will enable their distributors to function more efficiently in serving the customers' needs.

Distributors point out that many manufacturers never mention in their trade paper advertising and other promotional activities that their products are obtainable from distributors. Generally, the manufacturers carry in their advertisement a sentence stating that literature and price information can be obtained by writing the home office. This sidetracks the distributor. To illustrate what they have in mind, they point out that a prospective customer in the middle west might be favorably attracted to a product advertised by a manufacturer in New England. This manu-

The Author



SAMUEL H. CLARK is president of Samuel Harris and Company, Chicago, Illinois, industrial supplier, as well as president of the National Industrial Distributors' Association. A resident of Northbrook, Illinois, Mr. Clark, age 58, belongs to the Scottish Rite. During World War I he served in the U. S. Navy and, during World War II, he was in the U. S. Coast Guard, serving on the Coast Guard Cutter "Campbell."

facturer might have distributors located within a mile or so of the prospective customer but the manufacturer asks him to write to New England for literature and other information which he could secure in all probability from the same distributor from whom he is buying many other products if the manufacturer simply indicated that distributors carry and sell his line. To encourage manufacturers to do this, the two associations are now recognizing manufacturers who cooperate by presenting them with suitable awards at their annual conventions.

NEW FACTORS

IN MORALE DEVELOPMENT

"Today's problem of maintaining high worker morale differs sharply from that facing the supervisor during the hectic war years or the earlier formative years between 1900 and 1941."

By ALFRED M. COOPER
Contributing Editor, Modern Machine Shop

Most industrial foremen and office supervisors of today served their supervisory apprenticeships either in the teeming factories of World War II, or within the armed forces. In either instance a lot of water has gone under the industrial dam since the early 1940s, and nowhere in supervisory practice has there been greater changes than in the discharge of the supervisor's No. 1 human-factor responsibility: that of keeping a high degree of worker morale in his department.

Today's problem of maintaining high worker morale differs sharply from that facing the supervisor dur-

ing the hectic war years. And it differs even more widely from the morale problem confronting the foreman in the earlier formative years between 1900 and 1941.

Looking back for a moment, we find it practicable to divide our industrial past into three completed periods. In each of these, different sets of economic and political conditions made advisable the development of worker morale through widely differing methods.

The three periods may be defined as: 1900-1941; 1941-1945 and 1945- 1957. We are now just entering on a fourth period—one that

offers the greatest promise of any to American industry and its workmen, yet which also may be fraught with the greatest perils this nation of ours has ever encountered—and overcome.

It may be worth while to check the methods of developing proper *esprit de corps* which were successful in each of the periods already completed, and from this study determine what new methods may be called for as we enter the vital fourth period.

FIRST PERIOD

Of course, American industry did not originate with the turn of the century. But modern industry did. Between 1900 and 1941 we experienced a steady, sound growth. This growth was accompanied by the usual growing pains, most of which resulted from the efforts, either of management or government, to impose some form of paternalism on the industrial employee.

But the growing pains brought about, by trial and error, an understanding that the secret of sound industrial progress lay largely in the selection and training of sound key-men industrial supervisors. Thus, even as early as 1914 the first foremanship training conferences were instituted within a number of our largest metalworking plants.

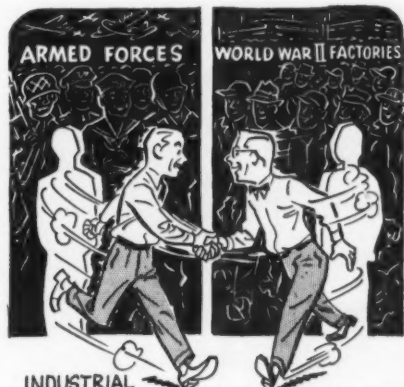
Almost the first problem faced in these early training sessions was the necessity for developing, from seasoned supervisors, methods they had found successful in maintaining a high degree of worker morale in their departments.

By the time some scores of con-

ferences had been conducted in a number of widely separated plants it became evident that the better type of foreman, even at that early date, had been giving quite a bit of thought to this subject for a number of years.

The *consensus* in these early conference groups on the subject of morale development may be summed up about as follows: a worker who was *interested* in his job, who was *satisfied* with his pay and working conditions, and who was properly supervised, would have the best attitude toward his job and his company.

Setting up these intelligent standards was quite an accomplishment back in 1914, *since there were plenty of foremen in these groups of that old school which believed the function of any boss was to drive subordinates to the limit of their endurance, and anyone who did not like such treatment could*



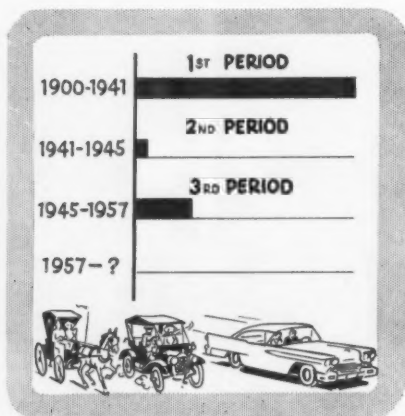
"Most foremen and supervisors of today served their apprenticeships in the factories of World War II or within the armed forces."

"... the more enlightened supervisor was retained on the payroll, while the old-time driver of men was dropped."

look elsewhere for a job. When we remember that most people were still working 10 and 12 hours a day, the attitude of these hard-boiled bosses was at least understandable.

Management, appreciating the dollars-and-cents value of improved employee morale that could be attained through improvements in supervisory practices, strongly favored the interest-satisfaction program of developing better employee relations. The savings in operating costs resulted from decreased labor turnover, less spoilage of material and less supervisor-workman friction.

As a result, the more enlightened type of supervisor was retained on the payroll, while the old-time driver of men either was persuaded to change his methods or was dropped.



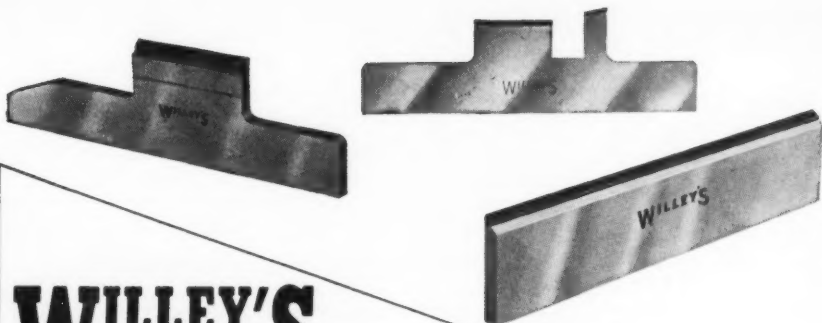
"The three periods may be defined as: 1900-1941; 1941-1945; and 1945-1957. We are now just entering on a fourth period..."

This brought about a steady improvement in supervisory practices, accompanied, of course, by increased worker interest and satisfaction. This early era was not an unbroken period of progress in supervisor-worker relations. There were a couple of severe depressions, the first world war, and instances of managerial shortsightedness with resultant worker unrest. But on the whole, American industry developed steadily along wholesome lines, and somewhere within the accomplishments of that earlier era we find the seeds of that world of automation we are entering today.

SECOND PERIOD

Back in 1942 and '43, as most of us can remember, about the best that could be said of personnel practices within many of our war-time factories was that they took the form of a more or less mild type of hysteria. Those were the days when brass bands were employed to blare stirring music from a hundred loudspeakers, so that the worker's "morale" might be improved; when plants found it essential to install swing-shift dance-halls for the boys and girls who had nothing to do between midnight and daylight.

It was also the day when the worker was encouraged to flout the authority of his superiors; when the greenest lathe hand, fresh out of NYA training school, could be heard to loudly proclaim, "I'm not working for General Electric (or



WILLEY'S

CARBIDE WORK SUPPORT BLADES FOR CENTERLESS GRINDERS

FROM STOCK standards & specials

**Thru-Feed • In-Feed • Long-Bar
Tube & Rod • Roller In-Feed
Race • Power Race
Heavy Duty**

WORK SUPPORT BLADES

for special application

Willey's have pioneered in the development and manufacture of carbide work support blades. Seasoned toolmakers with "know-how" build these tools for standard as well as for special applications. Many centerless grinding operations require special carbide tipped work support blades for work such as multi-diameter—angular—form—tapered or radius grinding.

RECONDITIONING SERVICE

Willey's regrind or carbide re-tip your worn out, chipped, broken or damaged work support blades to original accuracy... smooth—straight and parallel. For more than 20 years Willey's customers have used this service, often having the same blade reconditioned many times... a service and savings available to you too.

Write for complete
illustrated catalog
and price list



WILLEY'S CARBIDE TOOL COMPANY

1340 WEST VERNOR HIGHWAY • DETROIT 1, MICHIGAN
Woodward 1-9444

For more data circle 397 on Postpaid Card

June, 1958

modern machine shop 131

A wheel for every job . . .

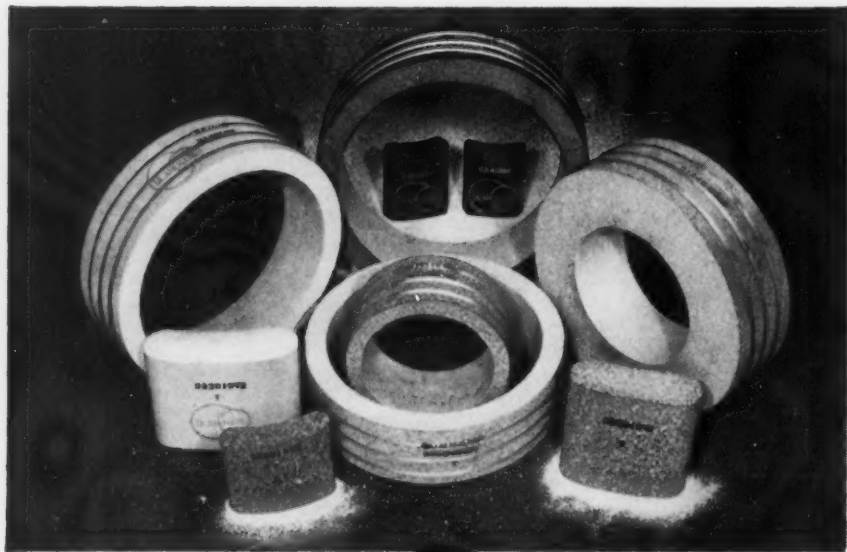
For every surface grinding job . . . whether tough as copper or fragile as glass . . . there's a Blanchard wheel that's best.

Blanchard grinding wheels, for use on Blanchard Surface Grinders, are made in cylinder, segment and sectored types. By selecting from a variety of vitrified, resinoid and silicate bonds and a number of different abrasives, Blanchard is able to make exactly the right wheel for every surface grinding job.

Precision duplication in the manufacture of every Blanchard grinding wheel assures you of identical results on all materials—regardless of finish or stock removal required.

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.



PUT IT ON THE **BLANCHARD**

THE BLANCHARD MACHINE COMPANY 64 State St., Cambridge 39, Mass.

Gentlemen: Please send me free copies of "Blanchard Abrasive Wheels and Segments" and "The Art of Blanchard Surface Grinding" (3rd edition)

NAME _____ STREET _____
FIRM _____ CITY _____ ZONE _____ STATE _____

For more data circle 398 on Postpaid Card



58-20

Here's Why Continental Counterbore Drives Never Bind! Never Fail!

Continental Counterbores operate precision-smooth and detach with a twist of the wrist because the driving forces generate compressing not shearing action in the holder. They never bind, deliver long-lasting, trouble-free operation.

In Continental Counterbores, you get extra torsional rigidity because drive lugs are close to the seating shoulder of the cutter. Double lugs on the cutter engage double abutments in the holder to form a powerful tool. But best testimony to the satisfaction you get from these counterbores is this: *no one has ever reported failure of a Continental Counterbore Drive!* For more information, call your local Ex-Cell-O Representative or write to Continental Tool Works in Detroit. Available individually or in a choice of three sets.

For more data circle 399 on Postpaid Card



Continental
TOOL WORKS

Division of



EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

"... it is not surprising that our attitude toward development of worker morale in factories became utterly confused."

General Motors or General Foods). I'm working for Franklin D. Roosevelt!"

This, we were told, was the worker's "bloodless revolution." This was the "century of the common man." *It was also the period in which an intelligent foreman had to learn somehow to wheedle a fine bunch of incompetent prima donnas into turning out something approximating a fair day's work;* when, despite all of the hysterical hullabaloo (or perhaps because of it) this worker's average daily production fell steadily to but 40 percent of that in 1940.

Looking back, it seems impossible that all these things really happened, between '42 and '45, less than 15 years ago. We remember it



"... an intelligent foreman had to learn to wheedle a bunch of incompetent prima donnas into turning out a fair day's work."



"... there were plenty of foremen which believed the function of any boss was to drive subordinates to the limit of their endurance."

now as a period of unbelievable American complacency, when block-buster bombs rained down on the homes and factories of every great nation on earth—except, of course, our own; when we could rejoice in the annihilation of a hundred thousand women and children by one of our new and beautiful A-bombs; when we considered it only just and right that we, the chosen people, should be spared all these horrors of war we had inflicted so successfully on the non-combatants of other nations.

Possessed of such a cock-eyed, unrealistic outlook on world affairs, it is not surprising that our attitude toward development of worker morale in our factories became so utterly confused. We failed utterly

"... nation possessing nuclear weapons found it imperative to pacify nation which had no nuclear weapons."

to distinguish between hoopla vaudeville and sound improvement of the worker's interest in, and satisfaction with, his job. We confused big wages with minimum effort, slowdowns and flouting of the vital foreman's authority, with "progress" in the field of industrial relations.

THIRD PERIOD

With the hysteria of the war years behind us, we found ourselves facing a period of readjustment in which everyone was jittery. We feared, and with some reason, that another great depression was about to wreck our war-gained prosperity. But government, after some hesitation, embarked on its "rearmament" program, which enabled it to "prime the pump" with 40 billions of dollars worth of ships, machines, and munitions of war. Thereafter, as we came to understand that our principal ally of World War II was now our most deadly enemy, we entered upon that amazing era of rearmament and appeasement which the phrasemakers have dubbed the "Cold War."

The era was amazing because it was during these years that we, the only nation possessing nuclear weapons, found it imperative to pacify by any means we could contrive, an aggressor nation which had no nuclear weapons at all. The reasoning here has never been made quite clear to any of us.

The years of the Cold War are not the ones future generations are

going to look back upon with the greatest degree of pride. But in industry they were years in which worker morale and individual production records were much improved, as compared to wartime industry. *The vaudeville in personnel activity was thrown overboard and the authority of the foreman to run his own job was restored.* With this was re-established his responsibility for developing the morale of those reporting to him. Once again he could make an appeal to those solid factors of worker self-interest and satisfaction upon which all lasting programs of morale development have been built.

Industry's steady progress, both in technological development and in human-relations supervision, has



"The vaudeville in personnel activity was thrown overboard and the authority of the foreman to run his own job was restored."

"... so long as wages remained high and jobs plentiful he could readily be persuaded that his family and country were 'secure'."

compensated in great measure by any errors that may have been committed by the statesman of both our major political parties. It has been freely admitted that our production, even under the trying conditions prevailing during the war years, was responsible for the winning of that war. Later we will come to understand that industry's advances during the period of the Cold War were almost solely responsible for keeping this great country on an even keel during one of the most unsatisfactory eras of her history.

FOURTH PERIOD

Contemporary commentators appear in agreement that the appearance in the skies of Russia's Sputniks 1 and 2 signalled the end of

the uneasy period of the Cold War. At the same time, within industry it became apparent that a change in the supervisor's attitude toward certain phases of morale development had become imperative.

During the Cold War years most of our emphasis in this field had been placed on securing for the worker that intangible something usually referred to as "collective and individual security." To the extent that the worker could be persuaded that our national policy of watchful appeasement was wholly effective, and so long as wages remained high and jobs plentiful, he could readily be persuaded that he, his family, and his country were "secure." About the only grievance he might register during this period had to do with high taxes, and he had long ago come to accept these as the price which he must pay for security.

In the meantime, until recently, the worker was convinced that our technological superiority far overshadowed that of any possible aggressor nation, and this, together with the general excellence of our entire system of public education, formed a perfect screen against the possibility of enemy attack.

However, even before the elevation of the sputniks as space satellites, industrial management had found it necessary to take sharp issue with our educators regarding their responsibility for the prevailing acute shortages of engineers and



"... until recently, the worker was convinced that our technological superiority far overshadowed that of any aggressor nation."

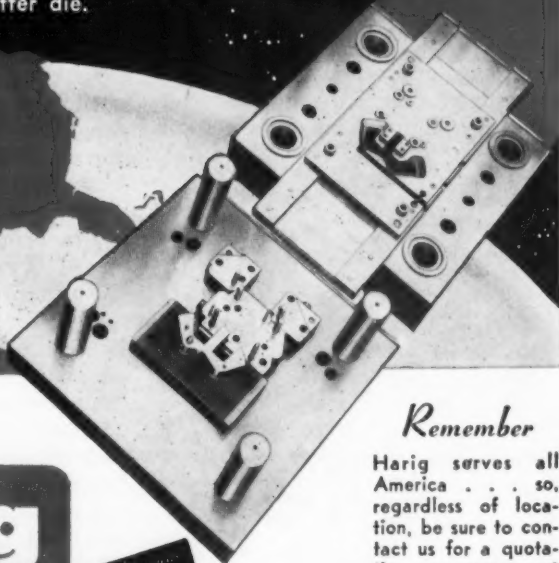
BREAK THRU THE
COST BARRIER with ...

Harig

CARBIDE DIES!

- ✓ LESS DOWNTIME
- ✓ LONGER LIFE
- ✓ BETTER STAMPINGS
- ✓ LOWER COST PER BLANK

Harig Carbide Dies typically out-produce steel dies 10 to 1 per sharpening and per die . . . yet cost only 1.5-2 times more than a steel die. Thus, a Harig Carbide Die affords you *true economy*. Harig is the industry leader because it has the skilled craftsmen and most modern equipment to build a better die.



Remember

Harig serves all America . . . so, regardless of location, be sure to contact us for a quotation on your next tooling program.

Harig

Manufacturing Corp.

5765 W. Howard St. • Chicago 31, Ill.

For more data circle 400 on Postpaid Card



WRITE FOR FREE CATALOG

"The problem of morale development becomes increasingly involved as the worker becomes progressively disillusionized."

scientists. In the course of this heated controversy it became evident to the man on the street (the worker) that our system of public education left much to be desired, so far as management was concerned, in the extremely vital fields of science and engineering.

This controversy also brought home to the worker the fact that, during the complacent years of the Cold War we had been definitely outstripped in the field of technical education by Russia.

Thus, the problem of morale development becomes increasingly involved as the worker becomes progressively disillusionized. As he comes to appreciate that neither government nor his employer can guarantee him or his family total

security (financial, physical well-being, or future tranquility of mind) so he must learn that any security he may ever attain depends solely upon his own vigilance and efforts.

It is also increasingly evident that the sort of employee morale that is worth anything at all when the chips are down cannot possibly be developed until the worker has become disabused of the idea that any form of "welfare state" can guarantee him and his entire family anything approximating lifelong security.

Fortunately, recent world events have partially completed this disillusionizing process. The new catchword now employed in the Pentagon, "The Gap," (that 2-year period during which Russia is assumed to have superiority in the field of nuclear missile weapons) will further aid in bringing the worker face to face with reality.

Epitomizing the long, careful look the worker is now taking at a not-too-secure future, the President, in his last speech of 1957, broke away from reassuring platitudes and called upon all Americans to be prepared for "sweat and toil, patience, courage, and self-sacrifice," a most realistic appraisal of the probabilities that lie ahead for all of us. Such an honest appeal bears little resemblance to the vague assurances of "cradle-to-grave" security to which the worker has listened for years, and will make sense to him.



"The new catchword now employed in the Pentagon, 'The Gap,' will further aid in bringing the worker face to face with reality."

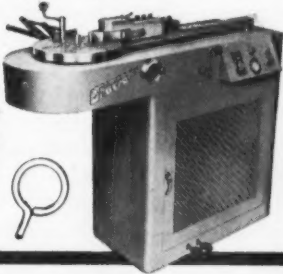


HIGH SPEED PRECISION BENDING

New Holland Machine Co. forms variety of components in 16 hrs. a day production.

DI-ACRO HYDRA POWER BENDER

Simple and complex bends are being formed at low cost in daily production across the nation with hydraulically operated Di-Acro Benders. The Bender can be delivered completely tooled by the factory for bending tubing, moulding, extrusions and special materials. For a free production estimate, send a dimensional sketch and sample material for your component.



SEND FOR "IT'S EASY TO BEND"

Thirty-six pages of valuable metal working information for anyone with bending problems. It's a "how to" book covering many materials and shapes. No charge—write today.

pronounced die-ack-ro

di-acro
PRECISION
METALWORKING
MACHINES

O'NEIL-IRWIN MFG. CO., 306 8th Ave., Lake City, Minn.

For more data circle 401 on Postpaid Card

**"... while the danger of war is imminent,
the actual shooting may never start."**

All of this awakening of the worker to the realities of the uneasy period lying ahead of us lays a solid foundation upon which the industrial foreman or office supervisor may build a truly up-to-date program of morale development.

Such a program will, of course, continue to stress good pay for an honest day's work, and the best possible working conditions that may be obtainable in any period of great national emergency.

In addition, the supervisor will do well to place emphasis on the following factors for improving employee morale:

1. There may well occur repeated periods of national emergency, during the next two years, in which it may appear that this country may suffer nuclear missile attack. The chances are excellent that such war scares will have originated in Russia, for the purpose of forcing further appeasement concessions from our government by means short of war. (Such a manufactured crisis may precede a strong push to seat Red China in the United Nations.)

In such instances the supervisor will do well to keep informed on all international developments, and after discounting much of the breast-beating of a frenzied Nikita Khrushchev, be in a position to clearly explain to any deeply disturbed subordinate what all the shouting is about. As both the supervisor and his subordinates pass through a number of such recurrent

crises, it will become increasingly evident to both that, while the danger of war is imminent, the actual shooting may never start.

2. As time passes, and Russia fails to take advantage of her temporary superiority in the missiles race, the supervisor may well find it possible to call attention to the reduction that already has been made in the 2-year period of The Gap. Certainly every effort will be made by our armed forces to bridge this gap as quickly as possible, and history proves that, once thoroughly alerted, industry and our high command have a way of performing seemingly impossible feats in record time.

3. Good morale, in any such period of stress, may be dependent



"... the supervisor will be in a position to clearly explain to any deeply disturbed subordinate what all the shouting is about."

**15% more torque from
the same air pressure
while consuming 30% less
air!**

It's the new



Air impact wrench!

"Free as the air" is an expression which has little application to compressed air. Learn more about the truly remarkable efficiency of the new Sioux Air Impact Wrench.



**Unexcelled Performance and
Durability....**

*It's
the*



Electric impact wrench



When it comes to electric impact wrenches, here is the maximum in dependable power per dollar. Available in $\frac{1}{2}$ " or $\frac{3}{8}$ " drive.



PELICAN

Spin nuts on or off without touching them... it's the new **SIoux**

Pelican NUT ACCUMULATOR

Action of the impact wrench removes nuts and spins them up into the Pelican on a center stem. The stem will hold ten $\frac{3}{4}$ " or 13/16" hex nuts, either 7/16" or $\frac{1}{2}$ " thread. Reverse action spins the nuts back on. Stems can be removed with their load of nuts and empty stems installed in their place. Or, stems can be pre-loaded and placed in Pelican for assembly operations.

The Pelican may be used with any $\frac{1}{2}$ " or $\frac{3}{8}$ " square drive, air or electric impact wrench.



PELICAN
IN USE WITH
NEW SIoux
AIR
IMPACT WRENCH



LOADED
CENTER STEM



ALBERTSON & CO., INC.
SIoux CITY, IOWA, U.S.A.

NEW AIR IMPACT WRENCHES. NEW AIR SCREWDRIVERS. NEW "PELICAN" NUT ACCUMULATORS. ELECTRIC IMPACT WRENCHES. DRILLS. GRINDERS. SANDERS. POLISHERS. SCREWDRIVERS. PORTABLE SAWS. VALVE FACE GRINDING MACHINES. FLEXIBLE SHAFTS. ABRASIVE DISCS

For more data circle 402 on Postpaid Card



"... he will do well to emphasize that such measures do not in any way protect us against nuclear explosions."



"The supervisor should never needlessly minimize the very real danger that faces this country during the next two years."

in some degree upon the vigilance of the industrial supervisor in detecting evidence of subversive intent on the part of those few employees who are not 100 percent loyal to their country.

The supervisor cannot, of course, set himself up as a counter-espionage agent, but he must not fail to listen carefully to any report that comes to him from loyal employees which concern actions of other employees that may be regarded as suspicious. He should also bear in mind that all of the atom-spy traitors who have been executed within the past twelve years have been people of apparently irreproachable character and background.

Suspicious actions and circum-

stances he will report at once to his superior, without recommendation of any sort. The head man will know how to proceed with such investigations as are deemed necessary as security measures.

4. *The supervisor, in his contacts with subordinates, should never needlessly minimize the very real danger that faces this country during the next two years.* To attempt this would be to treat American workmen as childish ignoramuses who were too weak and selfish to face up to the realities of the age in which they live. We have already had too much of this sort of thing.

The American workman of today is surprisingly well-informed, and will react much better to a discussion of conditions as they actually exist, rather than to senseless platitudes designed only to minimize or conceal facts which cannot and must not be ignored by this workman.

5. Should the recent proposal for the enormously expensive construction of concrete fallout shelters throughout the United States be approved, the supervisor can offer some assurance of protection for his subordinates from radioactive fallout. He will do well, however, to emphasize that such measures do not in any way protect against nuclear explosions. The danger in any such program, as civil defense experts have repeatedly pointed out, is that the citizen may be persuaded that this construction may be

NEW!

SAVE

**TIME!
TROUBLE!
MONEY!**

Handy Gauge tells "O" RING thickness and O. D.

3 "O" Ring thicknesses are in the Kit and the gauge mounted on the side gives you thickness measurements. By doubling the cross section thickness of the ring and adding the result to the I. D. (shown on each peg) the result is the O. D. of the ring. Use this gauge for rings removed from equipment as well as those in the Kit.



**UNIVERSAL
SELECT "O" RING KIT No. 2**

**180
"O" RINGS
SIZES 1 to 25**

Fills Replacement Needs on 85% of All Industrial Equipment

No hunting for Needed Sizes! Efficient, patented and shock resistant plastic case shows at a glance the sizes of "O" Rings in the Kit. Each peg is accurately sized and no other size ring will fit that peg. Interchange information of all leading producers of "O" Rings supplied with each Kit. All manufacturers' numbers converted to Universal numbers.

Silicone Rubber, Teflon, Butyl and Leather Back-up Washer Kits also available... write for prices.

BEARINGS, INC.

*Providing bearing service
in the North**

and

*in the South**

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elvira • Hamilton • Lima • Lockland • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute • **PENNSYLVANIA:** Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Parkersburg • Wheeling • **NEW JERSEY:** Camden
NEW YORK: Buffalo • Balerol Corp. • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington

**DIXIE BEARINGS
INCORPORATED**

FLORIDA: Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge • New Orleans
N. CAROLINA: Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport • Knoxville • Nashville

**Fill in and Mail
Today!**

BEARINGS, Inc., 3632 Euclid Ave., Cleveland 15, Ohio

Dear Sir:

Please send us _____ Universal "O" Ring Kits at \$24.50 each.
(Value of "O" Rings if purchased separately \$50.)

Name _____

Firm _____

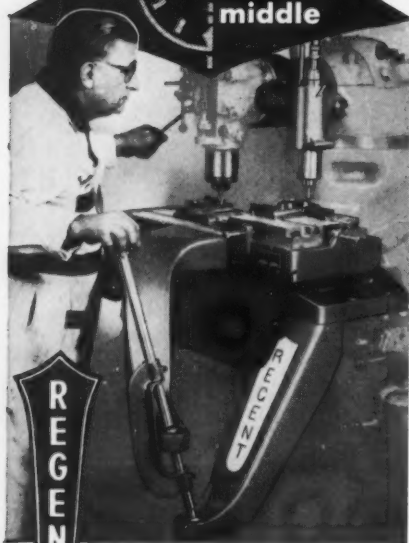
Address _____

City _____ Zone _____ State _____

For more data circle 403 on Postpaid Card

CUT PRODUCTION TIME

**right
down
the
middle**



REGENT

**2 or 3 dimensional
FLUID MOTION**

Duplicator Tables

Fastest Profile Milling and Duplicating

Save up to 50% and more machining time on contoured parts with both the R-200 and R-300 models. Single-lever control allows operators to duplicate complex parts in a fraction of the usual time.

R-200 — 2-Dimensional Profiler for any vertical miller

R-300 — 2- and 3- Dimensional for Bridgeport millers

Capacity: 6" x 6" (7" x 6" Special)
1 to 1 ratio with master

For literature write to

J. M. KALINS & COMPANY

1579 Railroad Ave., Bridgeport, Conn.

For more data circle 404 on Postpaid Card

144 modern machine shop

**"Any warning of attack
will be accidental."**

sold to the tax-payer as protection for himself and his family against any eventuality of attack by nuclear weapons. As Gen. Curtis Le May has pointed out, any warning of missile attack which his Air Force may be able to give us "will probably be more or less accidental." This is another instance of a man in high military position who refuses to deal with comforting platitudes when discussing problems of national survival.

The supervisor who wishes to preserve the highest type of employee morale among his subordinates will do well to take a lesson from this Air Force chief and keep all discussions of problems that are connected with civilian survival on a careful level of cold reality.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



**"So what if there is just a little bit of
gas vapor left in that tank — he says."**

June, 1958

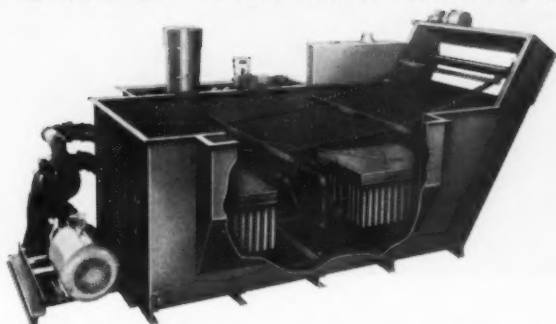
For Super Finishes at Less Cost

Delpark

Dual Manifold, Vacuum Filter-Matic Filter

Dual Manifold Tubular
Screen Filter shown.

Leaf Type Filter Elements
also available.



SUPER finishes no longer carry a high cost per unit. The reason is the high efficiency filtering action of the Delpark Dual Manifold Filter-Matic.

1. The rejection rate is greatly reduced.
2. Accuracy is more easily attained be-

cause of the reduced coolant temperature.

3. Machine maintenance time is reduced.
4. Filter servicing is no longer required.

Write today for the Delpark Dual Manifold Filter-Matic Filter bulletin.

Delpark

—First in Filtration Advancement

INDUSTRIAL FILTRATION COMPANY

13 INDUSTRIAL AVENUE
LEBANON, INDIANA

For more data circle 405 on Postpaid Card

June, 1958

modern machine shop 145



As these torpedoes are uniform



...So Card machine screw taps are uniform, too

Your production's consistent ...because Card taps are uniform

Your first step in consistent production performance is the cutting tool itself. Because Card machine screw taps are identical they keep production up to par — and predictable. Shopmen know about the uniformity of Card taps. Card gages are like that, too.

S. W. CARD DIVISION, Mansfield, Mass. Card Warehouses: Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York City and San Francisco.



CARD

DIVISION OF UNION TWIST DRILL COMPANY

— Serving you through the best distributors from Coast to Coast

For more data circle 406 on Postpaid Card

*If you use inserted blade cutters
as much as printing presses
use newsprint...*

*This brand cuts down your cutter
usage, production time and costs!*



*The more you use cutters
the more you need Union*

Union cutters — best in design, materials and workmanship — provide consistent top performance and lowest costs per piece you produce. Union builds special profit-boosting advantages into them. Besides this type of cutter, Union also makes solid milling and gear cutters, drills, end mills, reamers, hobs and carbide tools. **Available nationally through Union Distributors** and stocked in Union warehouses in Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York City and San Francisco.



UNION

TWIST DRILL COMPANY, Athol, Massachusetts

S. W. CARD DIVISION, Mansfield, Mass.; BUTTERFIELD DIVISION, Derby Line, Vt.

See Your UNION DISTRIBUTOR for cutting tools that will save you time and money

For more data circle 407 on Postpaid Card

more production through modernization

**Techniques for increasing output with
newly developed machines and tools.**

Edited by LOUIS H. DOERMAN

Automatic Welding Simplifies Design and Fabrication of High Pressure Cylinder

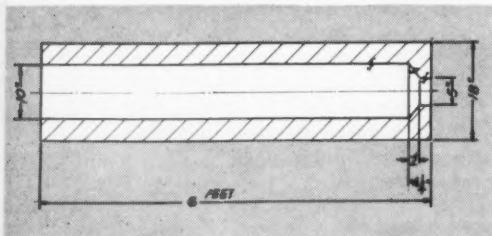
By E. E. MARTINAC

Assistant Superintendent of Maintenance,
The Lincoln Electric Company, Cleveland, Ohio

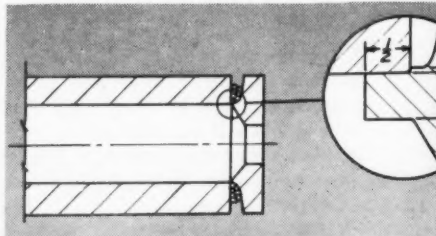
A butt weld in a four inch thick steel cylinder solved a design problem encountered in a large 15,000 p.s.i. pressure cylinder that was recently fabricated in the maintenance shop of The Lincoln Electric Company.

The cylinder was six feet long, had an 18 inch o.d. and a 10 inch

i.d. that funneled down to 5 inches at one end. The problem was simply how to design the part so that it could be built economically. Sand-cast steel, the obvious material, was ruled out because of the possibility of porosity and sand inclusions. Also, it would have been difficult and expensive to machine the i.d. of such a casting. It would have been necessary to send the job to an outside machine shop as no equipment in our shop would have handled the job. The solution was to first machine the funnel in an end plate and then weld the plate to a large forged shell with automatic submerged arc equipment.



Cross section of the desired pressure cylinder. The funnel shape on the i.d. made machining a one-piece steel casting expensive. Instead of using castings, plant engineers designed the cylinder as a weldment.



The design utilized a forged shell and an end plate that the maintenance department premachined to finish dimensions and submerged arc welded to the shell which was supplied already prepared for welding.

A machinist turned the end plate from a 4½-inch thick disc of C-1040 steel. The funnel section tapered from 10 inches to 5 inches in 2 inches of length. This, plus the remaining 2 inches of 5 inch i.d. was machined to finish dimensions before welding. The machinist also prepared the joint for welding. A ½ inch thick shoulder was inserted into the shell. A J-groove butted the end of the shell. The groove was 2 inches wide at the top and ⅝ inch wide at the bottom. An extra 1/16 inch was left on the ½ inch shoulder at the bottom of the joint to give a 9/16 inch thick land. After machining, the end plate was ready to join the shell.

The shell was already prepared for welding when the maintenance shop received it. To fabricate the 2 ton shell, the supplier first selected a large block of A.I.S.I. 4130 steel as raw material. He formed this block into a solid 18 inch cylindrical bar. Then, by a process similar to trepanning, he cut out the core of the bar to produce a shell with an i.d. of roughly 10 inches. Honing brought the i.d. to finish size and the ends were machined flush to form the straight side of the single J-groove welding joint. In preparation for submerged arc welding, welders tacked the machined end plate to the shell.

The setup for automatic welding was similar to that used for most of the roundabout welding done in the maintenance department. Two sets of idler rolls supported the cylinder, a positioner gripped the far end of the cylinder and turned it, and the carriage-mounted Lin-



Setup for the submerged arc welding. Operator preheated the joint to 400 degrees F. and deposited continuous small beads, stopping only to put on a new coil of electrode. Bead sequence helped control bead shape.

colnweld head did the welding. Standard agglomerated number 840 flux and a ½ percent molybdenum, 70,000 p.s.i. tensile strength electrode were used on the job.

The operator preheated the joint to 400 degrees F. and maintained that temperature during welding. He used a 5/32 inch electrode with 550 amperes, 30 arc volts, and 24 i.p.m. travel speed. Bead sequence was important. The first bead in the bottom of the joint was a fillet weld against the face of the shell. The next bead washed up against the end plate side of the joint. The third bead went between the first two. The next went against the shell again and the cycle repeated until the joint was filled.

More Production . . .

This sequence, with the fast travel speed used, resulted in a continuous series of small beads with good bead shape. Slag fell off in large pieces when an air gun vibrated the joint. A total of 85 pounds of weld metal was deposited in the joint. Welding required five hours.

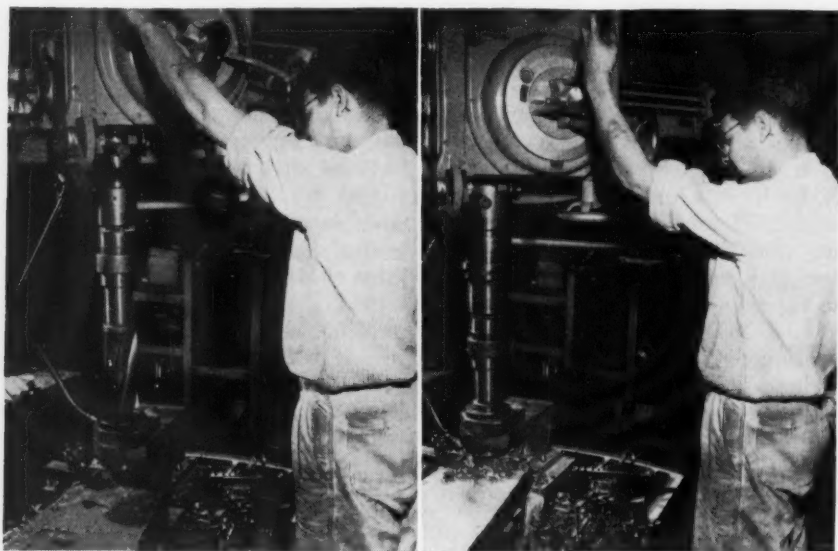
Shrinkage due to welding was negligible. For a length of one inch either side of the weld, the i.d. shrunk between 0.008 and 0.010 inch. The face of the end plate pulled slightly so that the length of the cylinder on the o.d. was 0.050 inch shorter than on the i.d. This was of no consequence on this job.

For more data circle 73 on Postpaid Card

Tool Change Reduces Core Drilling Costs

Savings of 1.9 cents per hole drilled were recently reported at the Caterpillar Tractor Company plant at Joliet, Ill. The reduction from 9.5 cents per hole to 7.6 cents per hole occurred when tool engineers at the plant replaced conventional core drill holders and stub taper tips with Metcut Pin-Mount core drills.

The workpiece, a draft arm, is made of alloy steel 3 inches thick. During the drilling operation approximately 2 cubic inches of metal are removed. The tool used is $3\frac{7}{8}$ inches in diameter with a high speed steel tip and is operated at 98 r.p.m. and a feed of 0.018 inch.



At the left is shown the start of the core drilling operation on which savings of 1.9 cents per hole have been achieved by

changing tooling. On the right, the $3\frac{7}{8}$ -inch drill is shown after having drilled through the 3-inch thick workpiece.

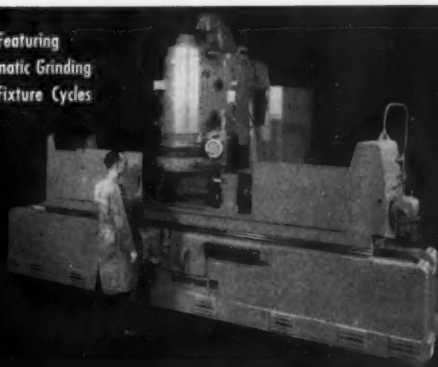
THOMPSON handles the toughest production jobs... fast and accurately...

with THE VERTICAL SPINDLE SURFACE GRINDER

SPECIFICATIONS

Size: 18" x 18" x 62"
Wheel: 22" Segmental
Production: 30 blocks
per hour
Total Stock Removal: .010"

Featuring
Automatic Grinding
and Fixture Cycles



Shown above is the latest Thompson vertical spindle machine grinding the diesel engine cylinder blocks of a leading truck manufacturer. To meet the demand for fast, continuous production, both the fixture and grinding cycles are automatic and are interlocked to prevent accident. A separate hydraulic power source operates the single place fixture which locates the cylinder block on the main bearing holes.

Since any variations in stock removal would affect the compression ratio of the engines,

constant accuracy is controlled throughout the grinding cycle. The operator merely sets wheel contact with the work and automatic operation begins.

Thompson vertical spindle surface grinders are made in various types and sizes to meet all job requirements. All machines of 40 inches and up in work length are equipped with the Hydra-Cool Hydraulic System*—the exclusive Thompson feature that eliminates all heat distortion throughout the machine.

*Pat. Applied For

MACHINE CYCLE (Total Stock Removal .010")



CYCLE I

- ① Load work piece into fixture and start table cycle.
- * ② Manually lower grinding wheel to contact work piece.
- ③ Automatic downfeed of wheel occurs at each table reverse to remove .010" stock.
- ④ Spark out to final size with table moving to start position.
- * ⑤ Manually elevate grinding wheel to starting position and release work piece in fixture.
- ⑥ Table automatically stops.

*Can be furnished as automatic functions.

For more data circle 408 on Postpaid Card



THE THOMPSON GRINDER CO.
SPRINGFIELD, OHIO

"Keep Thompson
In mind for that daily grind"

More Production . . .

The Pin-Mount core drills used speed cutting action since the deep flutes have as much as 60 percent greater chip capacity than with the previously used tools and permit single-pass, straight-through drilling of deep holes. The sturdy pins provide accurate flute alignment and positive drive. Setup time is minimized because the replaceable tips are easy to change and no re-adjustment of the machine spindle is required.

For more data circle 74 on Postpaid Card

★ modern machine shop ★

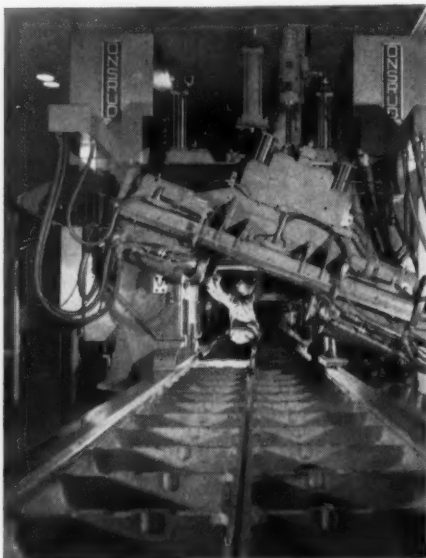
Electro-Hydraulic Drive Increases Milling Speed

New electro-hydraulic drive systems result in an overall increase in speed or accuracy of over 100 percent. Developed by the Onsrud Machine Works, Inc. in conjunction with General Electric Co., they are used on the A90-36A Automatic Contour Milling Machine, built for Convair, to provide the critical feed components of the multiple feed milling heads.

An example of how these new systems are applied is demonstrated by the No. 6 horizontal milling head of the machine. This milling head has four different feed components or four distinct motions that are operative either singly or in any combination to give any desired resultant feed in terms of direction and magnitude. These feed components consist of longitudinal, transverse, twist

or angular) and vertical motions and are all controlled through remote Selsyn type all electronic tracer systems. For this particular head, the vertical feed is critical and here electro-hydraulic drive is applied. As a result, the vertical feed component is capable of instantaneous response and high acceleration to provide an equivalence in motion for maintaining proper relationship with the other feed components under all conditions. As a result all possible transient and velocity errors are controlled.

The A90-36A provides a resolution accuracy to a tolerance of 0.0005 inch and a part-to-part reproducible accuracy to a tolerance of 0.0015 inch. This latter tolerance is held at a feed of sixty



This contour milling machine is overall 15½ feet wide and 105 feet long. It has six milling heads with a total of 560 h.p.

YESTERDAY'S PIONEER . . . TODAY'S LEADER

WELDON / HEAVY DUTY END MILLS AND HOLDERS

(BOTH ARE STOCK ITEMS)

● Look at this rugged 2" diameter Weldon end mill with 4" long flutes which made a 2½" deep cut in a solid block of 4140 die steel—heat treated to 260 Brinell.

This HEAVY DUTY Weldon end mill is held by an end mill holder which bolts securely on to the nose of the milling machine spindle. The holder is driven by two drive keys on the spindle nose. The 2" diameter shanks of these heavy-duty end mills are securely held by two large hollow head screws.

For top performance and sturdy long life in end mills—large or small—look to Weldon.

SEND FOR LATEST CATALOG NO. 11



Catalog list numbers are now marked on all Weldon tools and holders as an aid when reordering . . . another WELDON FIRST.

Weldon distributors throughout U.S.A. and Canada carry complete stocks to serve you.

THE WELDON TOOL COMPANY

HD4



3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

For more data circle 409 on Postpaid Card

June, 1958

modern machine shop 153

More Production . . .

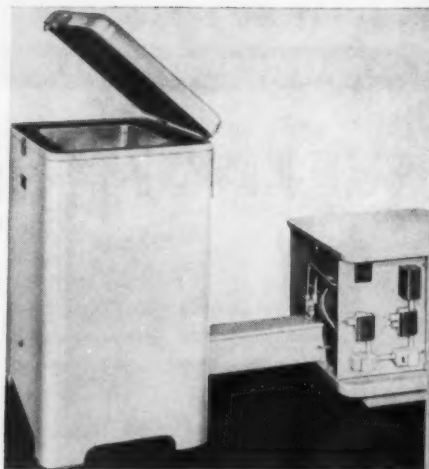
inches per minute on a radius of one-half inch. As radii increase, precision increases. The machine is equipped with six milling heads and has a work area three feet wide and sixty feet long.

For more data circle 75 on Postpaid Card

★ modern machine shop ★

Low Temperature Cycling of Guidance Components

Temperature cycling of critical initial guidance components for missile and aircraft systems at Sperry Gyroscope Co. is being achieved in a new unit constructed by Cincinnati Sub-Zero Products. The new model, SV-70-5-R, features a refrigeration unit which is isolated from the power pack. This is



This unit, featuring through-the-wall installation by means of a two foot insulated duct, temperature cycles guidance components at minus 70 degree temperatures.

achieved by using a through-the-wall installation with the refrigeration chamber in one room and the



Critical initial guidance components for missiles and aircraft are temperature cycles in this laboratory in a new refrigeration unit operating at minus 70 degrees.



Ter

The a
cream
emph
Prote
acco
mend
field
used
The r
tectio
from
We
norm
are p
contr
high

Progr
for Pr
and f



WEST

June



Ten weeks protection against DERMATITIS

The above 10 oz. tube contains enough cream to protect the hands of a valued employee for ten weeks. West Antiseptic Protective Creams are formulated in accordance with the accepted recommendations of leading authorities in the field of Industrial Dermatitis. They are used as easily as ordinary hand creams. The result: comfortable, invisible protection that keeps industrial irritants from prolonged contact with the skin.

West Antiseptic Protective Creams are normally used four times a shift. They are part of a program that overlooks no contributing source of dermatitis—the highly successful West Program of

Dermatitis Prevention and Control.

How does it work?

Lanokleen, antiseptic soaps and other specially formulated hand cleaners insure safe, effective cleansing. Germicidal specialties protect against bacterial infections. "Vinylite" aprons and armguards prevent clothing contamination. And, of course, Antiseptic Protective Creams help protect exposed skin areas.

The West Program of Dermatitis Prevention and Control is an inexpensive way to protect workers and management against the needless penalties of dermatitis. Interested? Just send the coupon. Or call your local West office.

Programs and Specialties
for Preventive Maintenance
and Protective Sanitation.



WEST DISINFECTING DIVISION

WEST CHEMICAL PRODUCTS INC.

42-16 West Street, Long Island City 1, N. Y.

Branches in principal cities

In Canada: 5621-23 Casgrain Ave., Montreal

- ☐ Please send your 24 page booklet,
"The Control of Dermatitis in Industry."
☐ Please have a West Representative
telephone for an appointment.



Name _____

Position _____

Mail this coupon with your letterhead to Dept. 16.

For more data circle 410 on Postpaid Card

More Production . . .

power unit in an adjoining room. The two are joined by an insulated duct twelve inches square and two feet long.

The remote power pack is 24 inches high, 30 inches long and 31 inches wide, with a table top construction to provide auxiliary work space. All adjustments are made from this external power pack by the operator.

The refrigeration unit is 43 inches high, 31 inches wide and 39 inches long, with an actual refrigeration chamber of five cubic feet which is 30 inches long, 18 inches wide and 16 inches deep. The external cabinet is of one-piece construction made from 16 gauge steel. It is phosphotized to prevent rust and finished in light grey. The refrigeration chamber is made from 14 gauge steel of electric welded pressure tight construction and hot-dipped zinc coated. All corners are rounded for added strength and safety as well as to facilitate cleaning the inside of the chamber. A Mullion heater in the channel cap prevents condensation of moisture assuring a dry cabinet exterior.

Factory set at minus 70 degrees F., the temperature range of the unit is adjustable from minus 10 degrees F. to minus 70 degrees F. The net thermal capacity of the unit is 500 B.T.U. per hour at minus 70 degrees F. There is a built in thermal overload and under voltage protection for the unit as well as a sealed-in lifetime oil supply.

The refrigeration chamber lid is counterbalanced to remain open at

desired positions and operates with finger tip touch. Positive lid seal is assured by a triple gasket design.

The built in system of rapid temperature adjustment together with rapid pull down from ambient temperature to minus 70 degrees F. makes this unit versatile and rapid enough to comply with modern production standards.

For more data circle 76 on Postpaid Card

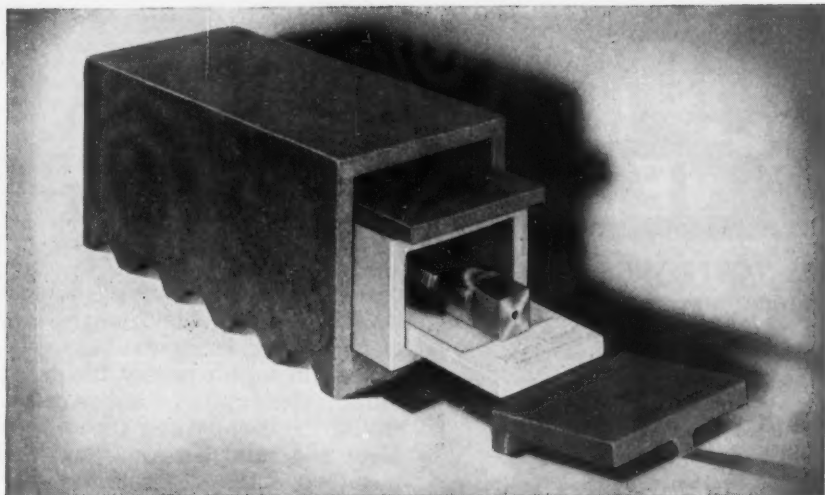
★ modern machine shop ★

Steel Forging Bored 8 Times Faster

Time savings of eight fold are reported by Peter J. Salmon Co. in performing five successive operations on a 14 1/4 inch long aircraft horizontal pin made of 4130 steel with a hardness of 39 to 43 on the Rockwell C scale. The savings were effected by replacing previous



New borer saves machining time in boring, counterboring and trepanning operations.



The Answer To Uncertain Tool Hardening **THE SENTRY DIAMOND BLOCK**

The truly neutral atmosphere produced by the Sentry Diamond Block unfailingly prevents scale or decarburization on all types of high-carbon high chrome or tungsten, molybdenum or cobalt high speed steels at hardening temperatures.

The Diamond Block Atmosphere is *constant*, not requiring the continual analysis or regulation associated with other generated atmospheres. Efficient and positive in operation, it safely permits ample soaking for full hardness.

Sentry Model "Y" Furnaces, designed especially for use with Sentry Diamond Blocks, provide the ultimate in high speed heat treating equipment at amazingly low cost.

Send samples of your high speed steel tools for free demonstration hardening, and/or write for the Sentry catalog for further details.

189-B



Sentry

TRADEMARK

ELECTRIC FURNACES

Request Catalog J-23 • Write **THE SENTRY CO., FOXBORO, MASS.**

For more data circle 411 on Postpaid Card

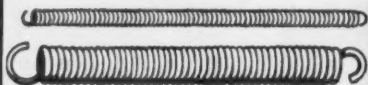
REID TOOL ROOM NEEDS!

COMPRESSION SPRING ASSORTMENT



Made from music wire. All sizes in diameters $\frac{3}{8}$ " to $1\frac{1}{2}$ ". All 10" long. Select the size required and cut to length wanted. Saves time and money.

EXTENSION SPRING ASSORTMENT



Made from music wire. All sizes in diameter $\frac{1}{8}$ " to 1". All 11" long with loop or hook at both ends. Cut to length desired.

FREE 74 PG. CAT.

Listing numerous tool room needs such as plastic and steel ball handles, machine handles, hand wheels, hand knobs, etc.

REID
TOOL SUPPLY CO.
MUSKEGON HEIGHTS,
MICHIGAN



For more data circle 412 on Postpaid Card

158 modern machine shop

More Production . . .

machining methods with a LeBlond-Carlstedt Rapid Borer. The bored hole is accurate to plus or minus 0.001 inch for length and concentricity and has a finish of 25 to 30 microinches.

The operation calls for five successive steps: solid boring a $\frac{5}{8}$ inch hole part way through from one end of the forging; counterboring to one inch diameter for part of the depth of the hole; forming a radius at the end of the counterbore; turning the piece and solid boring a one inch hole to meet the bore from the other end, and the formation of a radius at the point of union. All operations except the one inch counterbore are performed at a feed of $5\frac{1}{4}$ inches per minute. The counterbore is performed at eight inches per minute feed.

Additional economies have been realized through reduced spoilage. Since there is only one set-up and cycling is automatic the simplified operation has not only saved money in this way but has also made it possible for less skilled workmen to produce the part.

According to the manufacturer of the machine, savings of three to eight fold in machining time on solid and counterboring operations and in trepanning are not unusual. The machine is capable of feeds in excess of 30 inches per minute and hole capacities of $5/16$ to $4\frac{1}{4}$ inches in diameter. It will handle any stock that is symmetrical for balance in rotation—round, square, octagonal, tapered or stepped.

For more data circle 77 on Postpaid Card

June, 1958

Lifts e
turns
one ma

WRITE F
illustrate
to hand
without

DIX
Equip
For m

June



DIXON ONE-MAN COIL GRAB

CUTS TIME
AND COSTS WITH
ONE-MOTION
REEL LOADING

Saves labor and speeds coil handling. One man can lift, turn, and load coil with a single, easy motion. Positive grip and support eliminate coil damage, assure operator safety. Forged steel wedge separates coils easily. Standard sizes up to 15,000 lb. capacity available from stock.



Lifts and
turns in
one motion.

WRITE FOR COMPLETE DATA—New bulletins illustrate standard models and show how to handle all coil sizes safely, rapidly, without damage. Write for them today.



DIXON AUTOMATIC TOOL, Inc.

2314 - 23rd AVENUE
ROCKFORD, ILLINOIS

Equipment for Automatic Parts Handling and Assembly

For more data circle 413 on Postpaid Card

HIGH SPEED FLAT TWISTED AND ROLLED SECTION

DRILLS

*Unexcelled in Quality
and Performance since 1903!*

HI-DUTY Flat-Twisted and Rolled Section Drills are produced by forging and hot twisting bars of high speed steel. This method improves the structure by preserving the grain of the steel. Sizes range from $\frac{1}{2}$ " to $3\frac{3}{4}$ " and larger. Milled type drills are also available—from $\frac{1}{64}$ " to $\frac{1}{2}$ " diameter. Hi-Duty means long lasting economical service!

SPECIAL DRILLS

We manufacture a large variety of special types of high speed drills—special diameters and lengths; also step drills.

FAST DELIVERY...

We can make immediate shipment from stock on many special drills! Contact your Industrial Supplier or write today for Catalog and Price List.

HI-DUTY DRILL WORKS

FLEETWOOD, PENNSYLVANIA

For more data circle 414 on Postpaid Card



YOU CAN
BE SURE OF

with

Perfect Alignment

ROOF Heavy Duty Bull Nose Centers

Two double rows of quality bearings in the large and small ends of the nose of this Heavy Duty Bull Nose Center make perfect alignment positive on any type of work. Two shank sizes provide diameters from $\frac{1}{2}$ " to $7\frac{1}{2}$ " for a wide range of work with a single center. Write now for complete catalog.

HOUSTON GRINDING & MFG. CO., Inc.

P. O. BOX 7461 • HOUSTON 8, TEXAS

For more data circle 415 on Postpaid Card

ideas from readers

Several time-saving ideas and suggestions for the man in the machine shop.

Combination Roughing and Finishing Boring Bar

By HAROLD SEDLIK

We recently had the task of finishing the bore of a pulley casting. This was a low-profit job, thus precluding the use of elaborate tooling. The pulley was to have an odd-size bore, which eliminated the possibility of using a standard reamer for the job.

The work was to be set up and bored in an engine lathe. The job called for a roughing and finishing

cut; consequently, production would be low. To conform with the low production rate, we modified a standard boring bar to accommodate a roughing and finishing tool as shown in the accompanying sketch. The finishing tool was set 0.005-inch beyond the roughing tool.

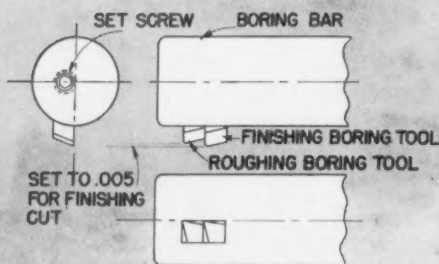
This combination roughing and finishing boring bar made it possible to rough and finish bore workpieces in one operation, therefore completely eliminating the need for indexing a tool post turret.

★ modern machine shop ★

Unusual Work-Clamping Method

By FEDERICO STRASSER

To allow for clamping in a vise a round workpiece which had to be machined on both the top and side surfaces without removing the workpiece from the vise, we used the clamping method depicted in the accompanying sketch. In each of the holes, A, of the workpiece we placed a cylindrical bar, B, in such



Sketch of combination roughing and finishing boring bar for low production work.

Sketch
drical
to be
faces

a way
not ex
the w
site e
a flat
corres
tance,
By tip
bars,
held s
faces
easily

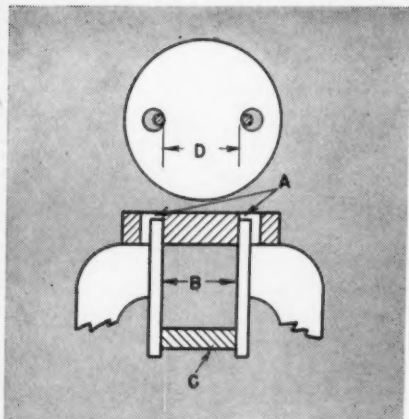
★ m

Simple
for A

By R. I

The
simple
drel
lathes
chine

June,



Sketch showing method for holding a cylindrical workpiece that allows the workpiece to be machined on the top and side surfaces without removing it from the vise.

a way that the ends of the bars did not extend above the top surface of the workpiece. Between the opposite ends of the bars, B, we placed a flat bar, C, the length of which corresponded exactly to the distance, D, between the two holes, A. By tightening the vise jaws on the bars, B, the workpiece was firmly held so that the top and side surfaces of same could be quickly and easily machined.

★ modern machine shop ★

Simple Expanding Mandrel for Machine Tools

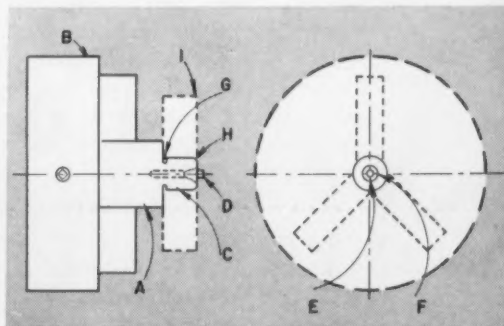
By R. B. COURTNEY

The sketch herewith depicts a simple-to-make expanding mandrel which can be used on turret lathes, engine lathes, and other machine tools employing three-jaw and

four-jaw chucks and collet type chucks.

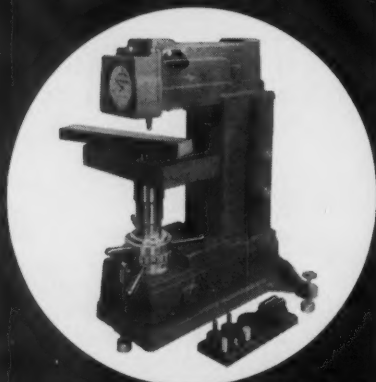
To make the mandrel, a piece of mild steel or aluminum stock, A, of the desired diameter is placed in a chuck, B, and rough turned to provide a shoulder of suitable length, C. The end of the piece is then drilled and tapped to accommodate a tapered pipe plug, D. The piece is next removed from the machine chuck and two slots, E and F, are cut 90 degrees apart from each other to the shoulder, as shown in the sketch.

The piece is now placed back in the chuck and the pipe plug is threaded into the mandrel until snugly seated. The mandrel is then finish turned, the shoulder is undercut 0.015 to 0.030-inch as shown at G, and the end is provided with a 45-degree by 0.040-inch chamfer as indicated at H. Next, the workpiece, I, is placed on the mandrel and the tapered pipe plug, D, is threaded further into the mandrel, thereby causing the split end to expand to a point where the workpiece is firmly retained on the mandrel.



Sketch of simple-to-make expanding mandrel for use on lathes and other machine tools.

2 Applications (Regular and Superficial) 1 Tester



KENTRALL MODEL CT-2 \$750.

Hundreds of installations over the past few years have proved the economy of the only hardness tester which combines all scales of Rockwell Test (15 to 150 kg. loads).

The Kentrall cuts costs because it does the job of two conventional testers, requires only half the space and maintenance. Write for more detailed information, plus a list of prominent users who have switched to Kentrall.

TB147

KENTRALL

THE TORSION BALANCE COMPANY

Main Office and Factory:

Clifton, New Jersey

Sales Offices: Chicago, San Francisco

For more data circle 416 on Postpaid Card

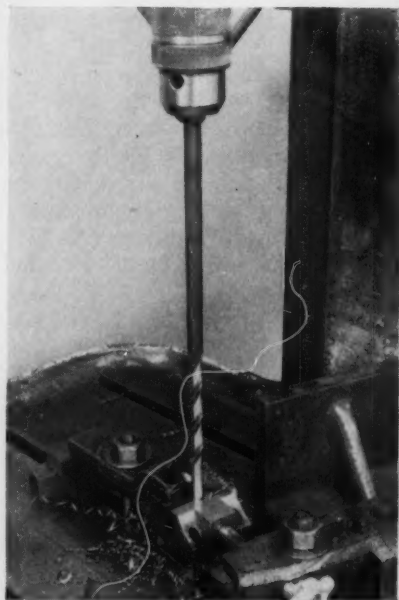
162 modern machine shop

ideas from readers . . .

Unique Method for Drilling Deep Holes in Round Stock

By H. J. GERBER

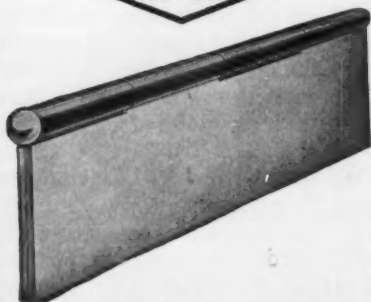
The accompanying illustration shows an unusual setup which we have frequently found speeds up production when deep axial holes are to be drilled in small diameter cylindrical work. To facilitate chip removal, the orthodox position of drill and work is reversed with the drill held in an upright position in the vertical "V" jaw of a drill press vise. The work is gripped in the



Unusual setup which provides for clog-free drilling of deep holes in round stock.

June, 1958

AUTOM



CONTINUOUS HINGES

Manufactured by

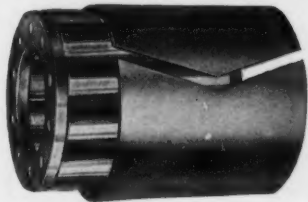
**AUTO MOULDING
& MFG. CO.**

WRITE FOR CATALOG

1114 E. 87TH ST.

CHICAGO 19

For more data circle 417 on Postpaid Card



TYPE GC

INDUSTRIAL ROLLER BEARING

STANDARD SIZES ARE SHOWN IN OUR
GENERAL CATALOG SENT UPON REQUEST.

SPECIAL SIZES TO ORDER.

ANY QUANTITY, "ONE BEARING OR MANY"

THE GWILLIAM COMPANY

Incorporated 1912

358 FURMAN ST.

BROOKLYN 1, N. Y.

For more data circle 418 on Postpaid Card

June, 1958

**HIGHER SPEEDS!
FASTER GRINDING!**

kipp

AIR GRINDERS

MODEL JA
50,000 R.P.M.

\$42⁰⁰

IN U.S.A.



Weight 12 ounces;
length 6¾ inches;
chuck size ½ inch.
Wheel guard removed
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

kipp

MADISON-KIPP CORP.

208 Waubesa St., Madison 10, Wis., U.S.A.

For more data circle 419 on Postpaid Card

modern machine shop 163

Greenerd PRESSES ARBOR & HYDRAULIC



- ASSEMBLING
- BROACHING
- FORMING
- STRAIGHTENING

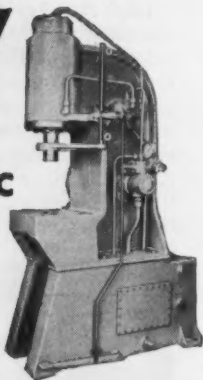
**ARBOR
Presses
1/4
to
20
TONS**



For 75 years, GREENERD has exclusively manufactured presses for production Assembling, Broaching, Forming, Straightening, etc., sold by Machine Tool Dealers and Mill Supply Houses.

GREENERD Presses may be furnished to J.I.C. standards.

**HYDRAULIC
Presses
2
to
75
TONS**



SEE HITCHCOCK'S CYCLOPEDIA

Greenerd ARBOR PRESS CO

For more data circle 420 on Postpaid Card

164 modern machine shop

ideas from readers . . .

chuck of the drill press and is rotated as it is fed downward onto the drill. The metal chips which are thus produced will now be aided by gravity in their flow out of the flutes of the drill.

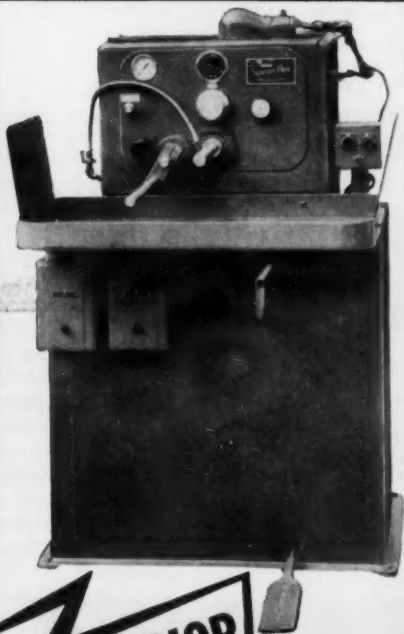
We have drilled $\frac{3}{8}$ -inch diameter holes 10 inches deep in work of this type without once extracting the drill in order to clear the chips produced as was frequently required when drilling the same job in a lathe.



June, 1958

For Better Honing

— OF MOST MATERIALS UP TO 3" DIAMETERS



- Shortens honing time.
- Cuts production costs.
- Achieves better finish.
- Longer stone life.
- Infinitely variable speed (250 to 1150 rpm).

Fully adjustable hydraulic system assures constant stone pressure, continuous cutting action, with no fall off due to wear or stock removal.

Single control dial shows when first piece is coming to finish size. Set, then compensate only for stone wear thereafter. Hydraulic clutch and brake.

**SUPERIOR
MODEL H. M.
HONEMASTER**

*Stocked in
all principal cities.*

SUPERIOR HONE CORPORATION

1615 Elrene Street • Elkhart, Indiana

Please send full details on the Honemaster.

NAME _____
FIRM _____
STREET _____
CITY & STATE _____
NAME OF SUPPLIER _____

For more data circle 373 on Postpaid Card

news of the industry

***New plants and expansions . . .
new appointments . . . meetings.***

Edited by R. M. SMITH

BUHR COMPLETES PLANT EXPANSION

Buhr Machine Tool Co., Ann Arbor, Mich., has recently completed a major plant expansion which is said to increase its production capacity. The expansion consists of two main bays—one devoted to heavy machining and the other to the assembly of multiple operation machines. The expansion involved an expenditure of approximately \$1,000,000.

Included in the new equipment is said to be the largest planer-mill in southeastern Michigan. This planer-mill is designed for mass production of standard bases, columns and other components for building-block type machines. The assembly wing adds suffi-

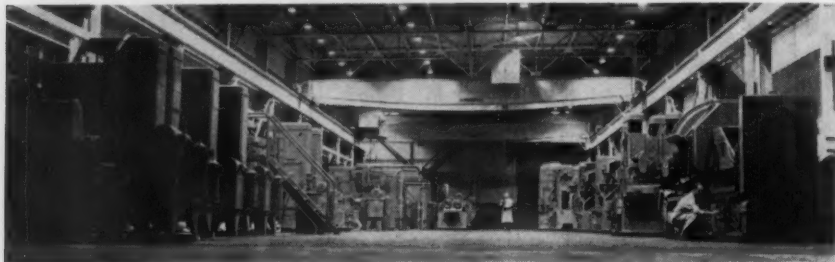
cient area to permit the assembling and testing of several complete production lines at one time.

★ modern machine shop ★

SIZE CONTROL DEVELOPS NEW GAGE DEPARTMENT

A new gage department has recently been set up by Size Control Co., Chicago, Ill., for the manufacture of special gages and precision parts.

This department can make special gages to exact customer specifications, or will submit designs for approval, prior to manufacturing, for special applications including automation. It houses machine tools available in areas that are rigidly controlled as to tem-



Picture showing part of the new assembly wing of the Buhr plant located in Ann Arbor. Being assembled are: at the left, two transfer machines; at the right, several multiple operation machines including dial, trunnion and other types.

perature, humidity and dust. Many research and development operations will find the new department particularly helpful in providing a source for short runs of high precision piece parts.

The special gage department is staffed by machinists with many years of experience in precision gage and piece part manufacturing. The gages and masters used are regularly certified as to accuracy by the Metrology and Gage Division of the U. S. Bureau of Standards.

Some of the products regularly produced by the new special gage and parts department include jigs, fixtures, flush pin gages, ID and OD length gages, built-up indicating gages, special snap and special groove gages. For special designs or unusual problems in precision piece parts and gages manufacturers are asked to submit prints of such parts and gages.

★ mms ★

STAMPING DESIGN SERVICE

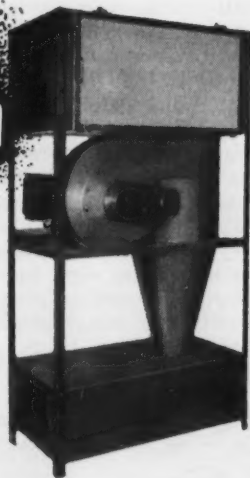
A new design service offered by Dayton Rogers Manufacturing Co., 2824 13th Ave., South, Minneapolis 7,

Minn., includes an actual production sample incorporating many of the conditions common to parts fabrication. Produced by short-run methods using temporary tools, the Design Suggestion Sample is made from 3/32 inch thick, commercial quality, cold rolled sheet steel SAE 1010. It shows typical mechanical problems met with in terms of material type, temper and thickness. Bulletin DSS-2 available from the company alphabetically codes

EFFICIENT-LOW COST

Dust Collection

Easy installation . . . efficient low-cost operation . . . simplified maintenance, make Dustkop *FIRST* among equipment to collect most all industrial dusts. There are Dustkop models to eliminate your dust problems . . . that are space saving, self-contained units, or exhaust type for rafter, ceiling or outside location. Write for descriptive literature.



37 STANDARD MODELS
TO CHOOSE FROM
• READY TO USE

Also a Complete Line of Mist Collectors

AGET MANUFACTURING COMPANY
1398 E. CHURCH ST. • ADRIAN, MICHIGAN

For more data circle 421 on Postpaid Card

the explanations to the sample. Conditions encountered in blanking, piercing and forming are covered.

Design Suggestion Sample and Bulletin DSS-2 are offered to specifiers and buyers of small lot stampings if they are on letterhead requests.

★ modern machine shop ★

SYMPOSIUMS ON "ROCKET AGE" MACHINING TECHNIQUES

A modestly conceived program of half-a-dozen two-day symposiums on the latest precision machining methods and techniques was undertaken recently by The Monarch Machine Tool Co., Sidney, Ohio. Over 450 representatives of some 200 manufacturing plants, engineering research laboratories and technical military establishments at Monarch's invitation, spent two days each at the company's Sidney, Ohio, headquarters. In addition to men from such industries as aircraft and missiles, electronics, instruments and metal processing, participants included U. S. and Canadian government personnel.

Utilizing a period of generally slow industrial activity, Monarch's goal was to bring busy manufacturing men up

to date on the latest in precision metal cutting by offering a solidly assembled two-day technical program containing data that could be immediately applied in the participants' own shops. Subjects covered—15 in all — included high-temperature alloy machining, missile hardware production problems, air-gage tracer contouring, tool materials, and surface finish requirements. The program material was, in fact, a distillation of a comprehensive 5-year machining research program recently completed by Monarch engineers and metallurgists.

★ modern machine shop ★

SUNDSTRAND PURCHASES ARTER GRINDING MACHINE COMPANY

Purchase of the Arter Grinding Machine Company, Worcester, Mass., by Sundstrand Machine Tool Co., Rockford, Ill., was approved recently by the Sundstrand board of directors. Involved in the purchase, according to Bruce F. Olson, Sundstrand president, are Arter's name, inventory, patterns, fixtures and patents. The building and the land are not included.

Of special significance in the purchase is Arter's tape-controlled positioning table. The 44-year-old New England company also manufactures cylindrical grinders, rotary surface grinders and special machine tools.



*You Need an Extra Hand Now
to Speed Up Production!*

HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

IN 11 SIZES—No. 6 to 1" N.C. In all S.A.E. sizes.

HEIMANN MFG. CO. • URBANA, OHIO

For more data circle 422 on Postpaid Card

Arter assets purchased by Sundstrand will be integrated into the capital goods division of Sundstrand under vice president Burnell A. Gustafson. This division currently operates machine tool facilities in Rockford and nearby Belvidere, magnetic and pneumatic products lines in Rockford and the American Broach and Machine Division plant at Ann Arbor, Michigan. The Arter equipment will be manufactured in the Rockford and Belvidere machine tool plants.

★ modern machine shop ★

JAMES A. SCULLY

James A. Scully, 81, board chairman of Scully-Jones and Co., Chicago, Ill., died recently at his home in suburban LaGrange Park. Mr. Scully founded the firm in 1912 and served as president for many years before assuming the post of board chairman.

A practical machinist who held executive posts in the metalworking industry several years before founding his company, Mr. Scully also designed a number of the precision tools and accessories.

★ modern machine shop ★

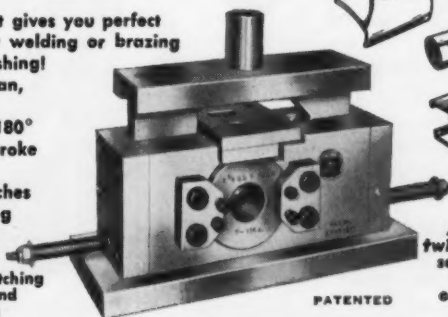
PORTION OF PRECISION CENTER GOES ON THE ROAD

Closely following the motif of the new famous Precision Center at the Brown and Sharpe plant in Providence, R. I., this company has placed in operation a Mobile Precision Center, which is scheduled to make a nationwide tour during 1958. Brown and Sharpe states the purpose of Mobile Precision Center is to present to the user at plants in the field, for viewing and inspection, as many actual products of the company as possible. The unit also accomplishes the service of

the **ARC-TWIN** *Cuts Two Perfect Notches* *in One Downstroke of Press!*

SAVING both time and cost, it gives you perfect T-joints — instantly ready for welding or brazing without deformation or finishing! Twin-acting punch shears clean, from inside out, leaving two matching notches (in perfect 180° alignment) with every downstroke of the punch press. Quickly interchangeable dies and punches accommodate pipe and tubing from ½" to 2½" O.D.; special units, up to 3" O.D.

Special Arc-Twins for double notching stainless steel or monel metal and units built to your specifications can also be furnished.



PATENTED

Ask for
twin-notched
sample of
pipe
or tubing

VOGEL

TOOL AND DIE CORPORATION

1823 North 32nd Avenue
Melrose Park, Illinois

For more data circle 423 on Postpaid Card

Make your mark

with a
HOGGSON
time-tested
**STEEL
STAMP**

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Hoggson stamps are made of finest alloy steel, heat treated to stand continuous impact without breakage of face or mushrooming of body. Available for marking letters, figures or symbols on almost any metal, plastic, or wooden product. Any style letter or figure in face sizes from $\frac{1}{32}$ " to $\frac{1}{2}$ ".

Write us for information, or see your nearest mill supply.

HOGGSON & PETTIS MFG. CO.,

New Haven 7, Conn.

For more data circle 424 on Postpaid Card
170 modern machine shop

news of the industry . . .

showing to plant personnel the many new products introduced recently by the company, there being over 600 new items during the past two years.

The Mobile Unit is equipped with many compact working displays of representative products from Brown and Sharpe's entire line of precision tools, metal cutting tools, screw machine tools and hydraulic products. The interior of the unit has a very attractive and colorful layout with both wall and counter arrangements of



(Above) Brown and Sharpe's Mobile Precision parks right at the plant's door. (Below) compact display of representative products gives the visitor an opportunity to inspect them and discuss their application to his particular problems — right at his door.

June, 1958

products to allow for close inspection and handling by visitors, if so desired.

The itinerary schedule for Mobile Precision Center has already taken it to plants in New England and southern parts of the country. The unit visited the company's Southeast territory consisting of the states of Virginia, North Carolina, South Carolina, Tennessee, Georgia, Alabama, Florida and Mississippi. It then proceeded west to Texas, New Mexico and Arizona. From there it traveled to the West Coast. After leaving the West Coast, the unit will cross the country to the Midwest and work farther east and back to Providence before the end of the year.

During a typical working day, approximately four plant calls are made by Mobile Precision Center. The reception has been most gratifying, with from 25 to 200 persons "coming aboard" the unit at each stop. Visitors at plants have included presidents and other officials, engineers, foremen, toolmakers, buyers and machine operators and so on.

★ modern machine shop ★

NEW DIRECTOR AND EXECUTIVE VICE PRESIDENT ELECTED AT EASTERN MACHINE SCREW

The Eastern Machine Screw Corp., New Haven, Conn., stockholders recently elected Charles W. Wesson a director at its annual meeting. The directors at a meeting held afterwards elected Mr. Wesson executive vice president and general manager of the company.

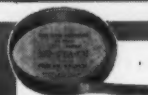
The other directors re-elected were: Carl W. Bettcher; Robert J. Hodge; Laurence K. Burwell; Clarence S. Russell; Arnon D. Thomas; William E. Hitchcock, Jr.; Charles S. Costello and Hobart J. Hendrick. Also re-elected by the directors were: Carl W.

SPECIFY TOP QUALITY



ARBOR SPACERS

SHIMS and SPACING COLLARS • Arbor Spacers and Shims in 20 sizes and thicknesses from .001" to .125". Arbor Spacers furnished with standard keyway; Shims, with no keyway. Also Spacing Collars in numerous popular diameters, and in thicknesses from $\frac{1}{8}$ " to 3". Hardened and ground; edges chamfered. Furnished with standard keyway.

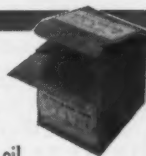


FEELER STOCK •

Made from tempered stock, rolled to close tolerances, $\frac{1}{8}$ " x 25' coils packaged in transparent plastic boxes, except above .020". Strips $\frac{1}{8}$ " x 12", in cellophane. 27 thicknesses. All thicknesses from .001" to .032". (For use in precision fitting, checking clearances, inspection and production work.)

SHIM STOCK •

Steel or brass. Selected from material rolled to precision limits, free from burrs, and protected by oil coating. Coils packed in carton for easy dispensing and protection. 15 thicknesses, .001" to .032". Sheets 6" x 12"; coils 6" x 120". Available also in two assortment packages—12 thicknesses, .001" to .015", and 15 thicknesses, .001 to .032".



WRITE FOR
Illustrated Brochure
and Price List



DETROIT STAMPING CO.

349 MIDLAND AVE., DETROIT 3, MICHIGAN
For more data circle 425 on Postpaid Card

modern machine shop 171

news of the industry . . .

Bettcher, president; Clarence S. Russell, first vice president; Laurence K. Burwell, treasurer and Thomas W. Higgins, secretary.

★ modern machine shop ★

CARBORUNDUM OPENS PRODUCT DEVELOPMENT LABORATORY

The Electro Minerals Division of The Carborundum Co., Niagara Falls, N. Y., has opened a product development laboratory. The Electro Minerals Division manufactures crude silicon carbide and aluminum oxide, abrasive grains and powders, tumbling nuggets, boron carbide, other carbides and oxides.

The new laboratory was built to meet the increasing demand for tech-

nical information, not only for the division's established products, but also for its new and improved product lines. The new facility contains a wide variety of laboratory equipment for product development and testing. It also provides pilot plant facilities for developing the manufacturing processes required for new products and the improvement of processes used in existing plants.

The new facility is under the overall direction of J. J. Forrester, Jr., manager, Product Engineering Branch, with M. F. Kiachif, manager of the Product Development Department, in direct charge.

★ modern machine shop ★

COATED ABRASIVE MACHINE SHOW

Fifty-three manufacturers of coated abrasive machine tools will demonstrate their new products in the Third National Coated Abrasives Machinery Show June 10-13 at Troy, N. Y. This year's show will take place in the new \$1,000,000 Product Engineering building of Behr-Manning Co., a division of Norton Company, which sponsors the event.

This year's show will include wood-working as well as metalworking machinery. As in the past, industrial production men will be invited to bring actual workpieces and test grind them

• PIERCING PUNCHES • BUTTON DIES • STANDARDS • SPECIALS

Also send Blue Prints for Estimates on screw machine products and centerless grinding.

PEMCO PERFORATORS CO.

DIVISION

PORTER MACHINE CO.

CINCINNATI 9

OHIO

For more data circle 426 on Postpaid Card

New 1958 Model "55"

RADIUS DRESSER



OUTPERFORMS THEM ALL
Cut production time without sacrificing accuracy! Easy to set, easy to see, eliminates necessity of guard removal. Somerset Radius Dresser turns "tricky" jobs into routine operations.

Low Price \$124.50
with Diamond

Write for free illustrated folder.

SOMERSET TOOL CO.

320 Virginia St.

Hillside, N. J.

For more data circle 427 on Postpaid Card

172 modern machine shop

Buy safe "SHUR-GRIP"



drop forged HANDLES

Designed to hold 3 to 6 lb. lead hammer heads more firmly — will not slip — keeps hammer head in shape longer — makes re-molding easier, quicker, surer, less expensive.

Write for circular and prices

LAWRENCE H. COOK, INC.

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

For more data circle 428 on Postpaid Card

June, 1958

on various machines, comparing machine speeds and pressures, abrasive grits, bonds and backings, contact wheel densities, lubricants and other variables. All machines will be in full operation. They will range in size from sheet publishers and big automatic equipment to portable air-driven tools for offhand work.

Nearly half an acre of floor space will be devoted to machinery demonstrations. In addition, the popular "Abrasive Tech" feature will be repeated several times daily, with brief lectures by Dr. Hugh N. Dyer, Behr-Manning director of product testing. These sessions will also present showings of a new color motion picture on offhand grinding, made up of in-plant scenes emphasizing techniques of workholding with the aid of jigs and fixtures.

★ m m s ★

CLEVELAND CRANE BUILDS NEW PLANT

The Cleveland Crane and Engineering Co., Wickliffe, Ohio, recently announced the breaking of ground for

a new 11,400 square foot Research and Development Building. The building will include an equipped air-conditioned engineering department and complete shop and testing facilities for assembling, handling and testing equipment under development.

It is believed that the new building, which is scheduled for completion in June, will be an asset for accelerating

B&W SAMPLER

**Brings Typical Spot & Center Drills
and Adapters for you to shop-test
without obligation**

**Ask
for
it**



You can't fully appreciate the convenience, low cost and time saving advantages of these tools until you try them. That's why we're making it easy for you to do so — at your convenience. Return the sampler after your evaluation — using label and postage enclosed. Any tools you may wish to retain will be billed later.

B & W PRECISION PRODUCTS CO.

**11393 E. Eight Mile Road, P. O. Box 3865
Detroit 5, Michigan, Engineering Dept. M.**

For more data circle 429 on Postpaid Card

the development of ideas for product improvement, as well as for completely new products and production methods.

Cleveland Crane manufactures heavy overhead traveling cranes, Cleveland Tramrail overhead materials handling

equipment, heavy Steelweld metalcutting shears, Steelweld press brakes and forming presses.

★ modern machine shop ★

ABRASIVE PRODUCTS NAMES DONALD W. SABEAN PRESIDENT

Abrasive Products, Inc., South Braintree, Mass., manufacturer of coated abrasive papers and cloths, recently elected as its president, Donald W. Sabean, at the corporation's annual meeting. Mr. Sabean, former company treasurer, succeeds R. G. Balcom, who died March 7, 1958, after serving thirty years as company president.

Other officers elected were: Alger L. MacLennan, Fred W. Harrington and Donald E. Miller, vice president; Philip D. Balcom, treasurer and R. J. Pyee, assistant treasurer.



Donald W. Sabean

RELIEVE EMBRITTLEMENT

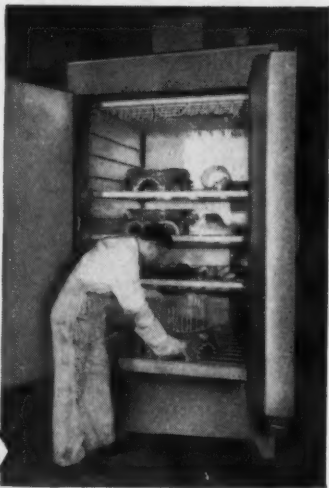
with a DESPATCH "RS" OVEN

This Despatch RS-3 oven

is used 16 hours a day at temperatures up to 550° F. Installed at the St. Paul, Minn. maintenance shops of Northwest Airlines, it is used in several important baking procedures. This includes stress relief from welding as well as relief of hydrogen embrittlement from plating on crank cases, landing gears, couplings, propeller shafts, knuckle pins, brake discs and other parts.

Specifications:

Despatch RS-3 Oven,
48" x 48" x 72" inside.
Electric: 17 or 26
KW; Gas: 83 CFH.
22 ga. steel with
3" or 5" Rock-
wood insulation.



Wherever electroplating is done, there's a Despatch Oven available for relief of embrittlement. Physical properties of the steel are largely restored and hydrogen is substantially removed by the heating process. Plated parts are usually baked from 1 to 5 hours at 375°-650° F. It is recommended that the baking operation begin immediately after plating and before the plated surfaces have been otherwise treated.

Write for fully illustrated No. 200 Bulletin



DESPATCH OVEN CO.
381 Despatch Building
Minneapolis 14, Minn.

For more data circle 430 on Postpaid Card

industry news in brief . . .

Geoffrey Grange appointed sales manager, **C. A. Norgren Company**, Englewood, Colorado.

James D. Kreager promoted to sales manager, **Engelberg Huller Company, Inc.**, Abrasive Machine Division, Syracuse, New York.

John G. Frischkorn Jr., appointed sales manager, Cleveland Tram-rail Division, **The Cleveland Crane and Engineering Company**, Wickliffe, Ohio. He succeeds **A. F. Anjeskey** who recently retired after 38 years with the company.

Dan E. Harrison appointed vice president and general manager for Midwestern Division, **True-Trace Sales Corporation**, El Monte, California.

Hans Neumann was recently appointed research supervisor and **Arthur C. Lansing** was appointed manager of the laboratory of the chemical division, **Michigan Chrome and Chemical Company**, Detroit, Michigan.

Robert J. Curley was appointed field representative to the West Coast and **William J. Hunt** was appointed field representative to upper New York State, **Atrax Company**, Newington, Connecticut.

The Onsrud Machine Works, Inc., announces the relocation of its Portable Tool Division, from 3900 Palmer Street, Chicago, Illinois, to 7720 Lehigh Avenue, Niles, Illinois.

Up To
10,000 psi Oil
from
Shop Air!



**AIR TO
HYDRAULIC
BOOSTERS**

**No Pumps or High Pressure
Valving Needed**

Hook a Miller Air-Hydraulic Booster to your air line and get INTENSIFIED (ratios up to 100 to 1) Hydraulic Power that you can vary and control at will and use for such common shop operations as punching, clamping, pressing, riveting, shearing, welding, crimping, testing, etc. High pressure booster output drives the hydraulic work cylinders and can be directly applied (without cylinders) in testing, measuring, other applications. Boosters save air, space, weight, require little or no maintenance, and hold pressure as long as desired without additional power consumption. Models for immediate delivery.



**Model 77
Shown**



**Write For
Full Details**



FLUID POWER DIVISION
Flick Reedy Corp.

2024 N. Hawthorne, Melrose Park, Ill.

For more data circle 431 on Postpaid Card

industry news in brief . . .

Walker-Turner Division of Rockwell Manufacturing Company, Pittsburgh, Pennsylvania, announces the appointment of five new dealers: **Industrial Equipment Company**, Springfield, Missouri; **Reynolds Tool Supply Company**, Chicago, Illinois; **French Mill Company**, Utica, New York; **The Zina-Goodell Corporation**, Salem, Mas-

sachusetts; and **Joseph Fletcher Company**, San Francisco, California.

Machinists' Tool and Supply Company, 2827 Supply Avenue, Los Angeles, California, appointed distributor in southern California, **The Producto Machine Company**, Bridgeport, Connecticut. In conjunction with **Southern Tool Distributing Company** of Atlanta, Georgia, Producto recently opened a die set assembly warehouse located at 54 Eleventh Street, N.E., Atlanta, Georgia.

Towle Industrial Corporation, 402 Bethlehem Pike, Philadelphia, Pennsylvania, appointed sales representative in Eastern Pennsylvania, Southern New Jersey, Maryland and Delaware, **Schauer Manufacturing Corporation**, Cincinnati, Ohio.

Francis E. Holland appointed assistant sales manager, **Butterfield Divisions**, Union Twist Drill Company, Derby Line, Vermont.

Frank W. Browne appointed district manager in West Coast territories, **The Warner and Swasey Company**, Cleveland, Ohio.

THE MOST USEFUL TOOL IN YOUR SHOP!

ECONOMY ELEVATING TABLE

- DIE HANDLER • CONSTANT HEIGHT TABLE
- LOAD LEVELER • PORTABLE WORK TABLE



Dimensions.....24" x 36" Lift.....24" min. to 42" max.

Capacity2000 lbs. Price: F.O.B. Chicago \$245.00

Free 10 day trial in your plant with return privilege

Positive Performance

Self-locking Acme screws hold load safely, securely, at any height. Roller bearing wheels.

Compact Design

No projecting parts—all four sides accessible; crank studs at both ends; three table surfaces.

ECONOMY
ENGINEERING

4507 W. Lake St.
Chicago 24, Illinois

For more data circle 432 on Postpaid Card

G. M. Stickell elected president and general manager, **Landis Machine Company**, Waynesboro, Pennsylvania. **J. H. Elliott** appointed chairman of the board and vice president. **R. E. Yingling** named director of sales. **D. Roy Stoner, Jr.**, succeeds Mr. Yingling as domestic sales manager. **A. R. Margin** appointed assistant export manager. Other appointments include: **L. M. Hess** appointed treasurer and assistant controller; **L. H. Randolph** appointed works manager of main plant; **F. Nell** appointed works manager in tap division; and **R. I. Eyler** appointed plant engineer.

William D. Marshall appointed assistant to product manager of Electrical Manufacturing Division, **The National Acme Company**, Cleveland, Ohio.

Verson Allsteel Press Company, Chicago, Illinois, announces the opening of a mid-west regional sales office located at 1355 East 93rd Street, Chicago 19, Illinois.

Standard Electrical Tool Company, Cincinnati, Ohio, announces the appointment of three men: **Virgil R. Lagaly** promoted to national sales man-

ager of all divisions; **Harold J. Wagner** promoted to chief engineer of precision spindle division; and **Ted A. Scherpenberg** promoted to assistant sales manager of the precision spindle division.

Martin T. Schumb appointed chief consulting engineer, **Boston Gear Works**, Quincy, Massachusetts. **S. George Belezos** succeeds Mr. Schumb as chief engineer of the company.

EVERY TIME YOU MOVE A MACHINE

Barry
Machine Mounts
CUT
MAN-HOURS
90%

In new
installations —
In relocating
machinery —

you get savings
like these!

3 man-hours
instead of 42 man-hours
to move machines at Johnson & Johnson

60% saving in new machine
installation cost at
American Type Founders

No lost production time
in moving a complete ma-
chine shop at Wyman-Gordon

Barry Leveling Machinery Mounts
let you move machines wherever they are needed,
and have them in full production in **minutes** —
with no delays for drilling, lagging, or shimmiing.

Write now for the Field Reports that prove these savings —
that you can get with Barry Machinery Mounts.

BARRY
CONTROLS
INCORPORATED

BARRY B MOUNT

SOLD THROUGH INDUSTRIAL
DISTRIBUTORS

783 PLEASANT STREET, WATERTOWN 72, MASSACHUSETTS

For more data circle 433 on Postpaid Card

industry news in brief . . .

Leslie M. Nelson appointed sales engineer, Cleveland Instrument Company, Cleveland, Ohio.

Adamas Carbide Corporation, Kenilworth, New Jersey announce the appointments of three distributors: M. B. Industrial Supply Company, 422 West Fourth Street, Santa Ana, California; De Jo Tool and Supply Com-

pany, 335 East Haley Street, Santa Barbara, California; and Ellis Machinery and Supply Company, 120 North 20th Street, Tampa, Florida. The Bauer Company, 1015-17 Norwood Street, Fort Worth, Texas, appointed representative in northern Texas and the State of Oklahoma.

A. T. Stewart has been appointed national sales manager for Veet Industries, East Detroit, Michigan.

WILSON "ROCKWELL"

THE WORLD'S STANDARD OF HARDNESS TESTING ACCURACY

A Complete Library of Helpful Information on Hardness Testing



No matter what hardness testing requirements you have, there's a WILSON instrument to do the job for you. WILSON's library of hardness testing information has data on applications—the principles of the "ROCKWELL" tester—operation—accessories—conversion tables—the full line of WILSON instruments.



Write for complete details on specific machines. Just check the bulletins of particular interest to you.

- | | |
|--|--|
| <input type="checkbox"/> DH-325 —WILSON "ROCKWELL" Hardness Testers, for most hardness testing requirements. | <input type="checkbox"/> DH-327 —Special "ROCKWELL" Testers, for unusual applications, including Automatic and Semi-Automatic models. |
| <input type="checkbox"/> DH-326 —"ROCKWELL" Superficial Hardness Testers, for extremely shallow indentations. | <input type="checkbox"/> DH-328 —TUKON Tester, for precision MICRO and MACRO testing. |
| <input type="checkbox"/> TT-58 —Twintester, which combines functions of "ROCKWELL" and Superficial Testers. | |

NAME _____ COMPANY _____

ADDRESS _____

CITY _____ STATE _____

WILSON

MECHANICAL INSTRUMENT DIVISION
AMERICAN CHAIN & CABLE
230-G Park Avenue, New York 17, N.Y.

For more data circle 434 on Postpaid Card



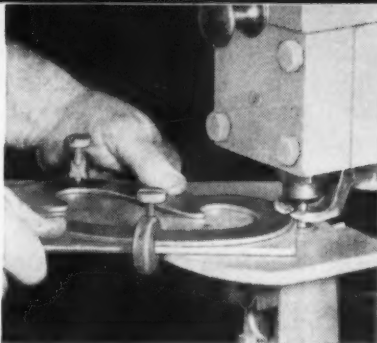
For fast, economical cutting of flat metal shapes there are 7 MODELS OF Campbell Nibbling Machines

...with cutting capacities ranging from 3/32" mild steel for **MODEL 0** machine to 1/2" mild steel for **MODEL 530**, in sheet sizes from 16" or less, to 72".

CAMPBELL NIBBLERS are making tremendous savings in time and money for hundreds of users in aircraft and other metal-working plants.

...in fast cutting of ferrous and non-ferrous sheet metals or composition sheets.

...for moderate production runs or experimental development work.



Economical
"throw-away"
punch and die

- CAMPBELL NIBBLERS cut from 40 to 60 times faster than drilling or filing. A fast-moving punch (350 to 900 strokes per minute) operating over a die, nibbles out the design, taking a small "bite" with each stroke of the punch.

- ...for any and all kinds of shapes
- ...for either inside or outside cuts
- ...with no distortion of material—no internal strains—no invisible fractures—no burr
- ...with a "nibbled" edge that is sufficiently smooth to require very little finishing and sometimes none

CAMPBELL standard punches are made double end to double work life and halve the cost. Prices are so low (starting at 40c each, or 20c per working end) that new punches cost less than regrounding dull ones.

Here is a quick picture of CAMPBELL NIBBLING MACHINE Capacities

Campbell Nibbler Model #	Sheet Width	WORKING CAPACITY Sheet Thickness		Strokes per Minute
		Mild Steel	Alloy Steel	
0.....	16"	3/32"	1/16"	900
1A.....	20"	3/16"	1/8"	375-650
430.....	60"	3/8"	1/4"	350-525
436.....	72"	3/8"	1/4"	350-525
530.....	60"	1/2"	5/16"	350-525
2524.....	48"	1/4"	3/16"	375-650
2536.....	72"	1/4"	3/16"	375-650



Send for this
catalog for com-
plete information
on this versatile
production and
experimental tool

CAMPBELL NIBBLERS

Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE

931 Connecticut Avenue, Bridgeport 2, Connecticut



For more data circle 435 on Postpaid Card

new shop equipment

**Descriptions of new machines, tools
and materials for metalworking.**

FOUR STATION DRILLING MACHINE IS ADJUSTABLE FOR A RANGE OF OPERATIONS

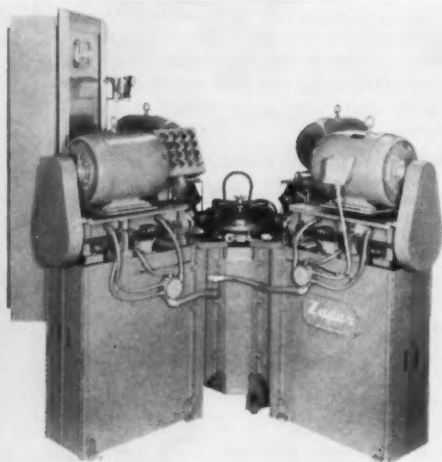
Zagar, Inc., 23898 Lakeland Boulevard, Cleveland 23, Ohio, has designed and built a small, compact machine to process aircraft parts.

The part can be drilled, countersunk and reamed from four sides simultaneously. The machining sequence can be varied due to the use of demountable Zagar Feeder Units. Additional opera-

tions can be done over and above those mentioned because the feeder units have a 10 inch stroke.

An index table with four holding fixtures rotates the parts between feed and return of the drill heads. The feed units lend versatility to the use and reuse of the equipment.

Drilling capacity is up to 1½ inches in diameter and the rated production is 80 pieces per hour. The cycling of the machine is completely automatic. For more data circle 78 on Postpaid Card



**Zagar Four Station Drilling Machine
features completely automatic cycling**

★ modern machine shop ★

CARBIDE DEVELOPED FOR GENERAL PURPOSE USE

Newcomer Products, Inc., Latrobe, Pa., has announced that it is marketing a carbide which has been developed for general purpose use.

Known as NewPro, the material is available in Grade S-35 for cutting steel (corresponding to Carbide Industry Code, C-6) and C-35 for cutting both cast iron and the non-ferrous materials (C-2, Carbide Industry Code).

Now being produced in volume, NewPro is stocked in standard sizes and styles of triangular and square "Throway" type inserts for mechani-

Edited by L. L. BALDHOFF

new
shop
materials

cal toolholders and in triangular and square "Throway" milling cutting blades. Rough molded blanks of all shapes and sizes, standard and special, can be furnished.

For more data circle 79 on Postpaid Card

★ modern machine shop ★

KNEE TYPE MILLING MACHINES FEATURE NUMERICAL CONTROL

Engineered specifically for three dimensional milling of small and medium sized workpieces of both ferrous and non-ferrous metals, three standard knee type vertical milling machines are now available for numerically controlled operation from Kearney and Trecker Corp., 6794 West National Ave., Milwaukee 14, Wisconsin.

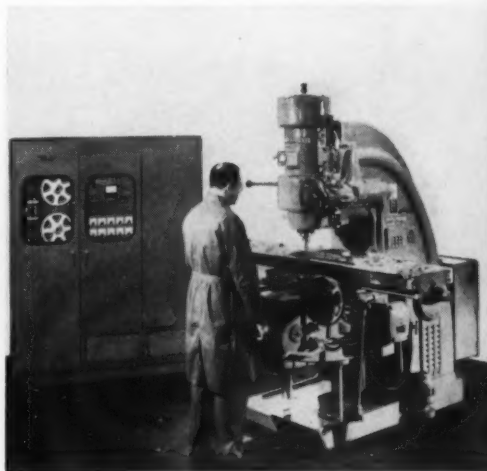
The three KTNC (Kearney and Trecker Numerical Control) models, are the 5 h.p. Model 2CH-KTNC with 16 spindle speeds ranging from 25 to 1,500 r.p.m. and two heavy duty 15 h.p. models, the 315TF-KTNC and the 415TF-KTNC, each with twin elevating screws and 24 spindle speeds ranging from 15 to 1,500 revolutions per minute.

Power for short feed motions is transmitted through low friction, recirculating ball screws, designed for high efficiency, long life and accuracy.

Three control systems are available; Bendix, G. E. and ECS-Digimatic. Proper selection of a particular control system will be determined by the job to be done, the price and the computer facilities available. Any one of the systems can be applied to any of the three machine models.

Tape preparation is available from Kearney and Trecker Corporation and from each of the manufacturers of the three systems.

For more data circle 80 on Postpaid Card



Kearney and Trecker 415TF Vertical Numerically Controlled Knee Type Milling Machine

new shop equipment . . .

AIR COMPARATOR GAGE FOR SHOP MEASUREMENTS AND SETUP

Sperman Metal Specialties, 2199 East 21st St., Brooklyn 29, N. Y., has introduced the Air-O-Test Air Comparator Gage, which is a new shop tool. The manufacturer claims that this is the first time that an air gage has been made to be rugged enough for rough shop handling, accurate enough to give consistent readings in split tenths of a thousand and low enough in cost to be placed on each machine in the shop doing precision work.

To make this unit economical to use in the shop or inspection department, Sperman has developed a method to easily make testing plugs and setups in a few hours. The company will be very glad to send information on how to make plug gages for air gage testing free of charge. These can be made by any toolmaker in about three hours,



Sperman Air-O-Test Air Comparator Gage

using ordinary toolroom machines; no super accurate machines are needed.

The Air-O-Test can also be used with simple setups on cylindrical grinders to tell when to size, on boring machines to show that the work has been placed in position right and has not shifted while being clamped. It can also be used on lathes, surface grinders and so on for sizing.

For more data circle 81 on Postpaid Card

★ modern machine shop ★

CARBIDE COUNTERBORES DESIGNED TO INCREASE TOOL LIFE

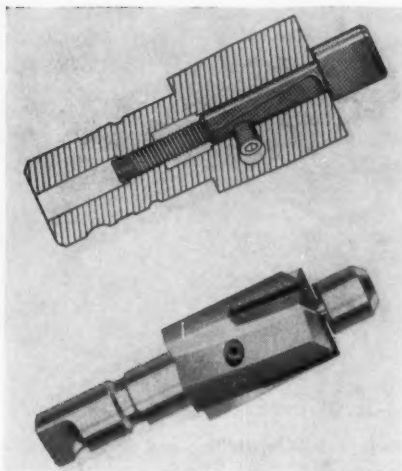
The improved Metcut Carbide Counterbore, announced recently by Metal Cutting Tools, Inc., 350 South Water St., Rockford, Ill., has been especially designed to increase tool life by preventing flaking of the carbide tips caused by excessive back pressure of the pilot.

The manufacturer claims that this major cause of carbide failure has now been overcome in the new cutter design by incorporating a special back-up screw to hold the pilot clear of the cutting edges.

The sturdy screw, located in the shank of the cutter, is quickly adjusted by a fractional turn with a hex wrench to hold the pilot in positive position and prevent back pressure on the cutting tips. Deep, strong threads provide a non-slipping grip, which resists loosening under vibration or temperature changes.

Since no pad is required in order to protect the cutting tips, the face of the cutter can be quickly and easily ground and reground without any danger whatsoever of destroying the special surface.

This particular Metcut design feature is available with pin drive, clutch drive or the taper torque shanks.



Metcut Carbide Counterbore has new design

Cutters are designed with three, four and six flutes, according to size. Standard Metcut Carbide Counterbores are available in 45 cutter sizes from 1/2 through 3 inch o.d. They are also made special in large diameters to combine additional operations, such as facing and chamfering.

For more data circle 82 on Postpaid Card

★ modern machine shop ★

HEAVY DUTY SHOP PRESS HAS 150 TON CAPACITY

The Hydraulics Division, K. R. Wilson, Inc., Main St., Arcade, N. Y., has announced a 150 ton heavy duty shop press.

Designated as the KRW 37KAA-150, this press has been designed to handle jobs up to 150 tons, yet it is sensitive enough to handle jobs requiring only the lightest pressure. The press features a heavy duty geared type winch with load securely held at

any point to permit one man adjustment of the bed height.

A two speed, hand operated pump gives the operator complete, accurate control of ram pressures. Open side construction, combined with extra large daylight opening permits handling of extremely large bars of shafts, and makes it an ideal press for straightening axles, connecting rods and similar applications.

Additional features of this press are: Capstan handwheel that speeds the ram to work in seconds and can be operated mechanically to 3 tons; pressure release control valve which can be opened or closed with a flip of the finger; detachable pump handle on the pumping unit, positioned at convenient operational height to prevent operator fatigue.

The 37KAA-150 ton shop press is available as either a hand operated or motor driven unit.

It can be purchased as a hand operated unit and converted to a motor drive later with the KRW conversion package.

For more data circle 83 on Postpaid Card



K. R. Wilson 150 Ton Heavy Duty Shop Press

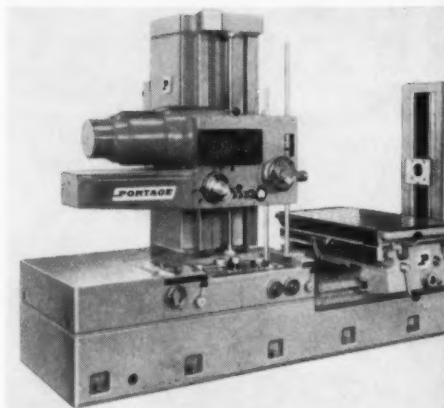
new shop equipment . . .

3 INCH HORIZONTAL MILLING, DRILLING AND BORING MACHINE

The Portage Machine Co., 1041 Sweitzer Ave., Akron 11, Ohio, has announced its horizontal milling, drilling and boring machine which is a versatile, multi-purpose machine. It has been designed and built for economical, fast and dependable work. Workpieces of many sizes, shapes and materials can be machined on the 3 inch spindle machine. The construction and control arrangement permits fast positioning and handling both long or short run lots. Power, spindle speeds and infinitely variable feed have been carefully selected to provide the best combination for operations with large or small cutting tools. Strength, rigidity and precision are built in features, making the machine suitable for toolroom use, general production or roughing work.

Separate spindle drive and feed drive motors offer a maximum of power to the cutting tools at all speeds and provide a flexibility of feed motions required for economical tooling. Infinite variable feed rate control permits control of surface finish and chip load. The feed rate setting is shown on a feed rate dial and can be preset before engagement of the head, table or saddle feed. Feed rates can be changed at the operator's option while feeding, even with the cutting tool under load. An extra low range feed shift is provided on the saddle feed for fine boring. Full range of saddle feed is from 30 inches to 0.03 inch per minute.

A double rack and pinion, with heavy duty double row ball thrust bearings on the spindle provide for feed in and out of the spindle. This open center design is said to permit heavy thrust loads without distortion



Portage Milling, Drilling and Boring Machine

in that the thrust load is directly transmitted.

The bed and column are of close grained cast iron securely bolted and dowel pinned together. All ribbing is placed to insure alignment and rigidity of the machine elements with the leveling screws so placed as to allow fast leveling and to hold the bed without strain.

The feed drive for movement of the head, table and saddle is by a separate motor in the bed and is infinitely variable for selection of optimum feed rates. The drive is by timing belt through a Worthington All Speed-Drive unit of 10 to 1 ratio and by high-low range gear reduction of 10 to 1 ratio to provide a variable feed drive of 100 to 1 ratio. The rapid traverse drive is from the same motor, but transmitted directly so that feed setting is unchanged and overload capacity of the motor is available for rapid traverse. Engagement of feed or rapid traverse is by friction disc pack clutches with overload protection providing neutral, feed or rapid traverse engagement to the feed distribution. Feed distribution is selectable by three double acting, positive tooth clutches,

enabling engagement forward or reverse to each machine element. The drive-out to the saddle has a separate back gearing with high-low selection of a 10 to 1 ratio, extra low feed. Micrometer adjustable dials are provided on wrench centers for movement of head, table and saddle to exact positions. Dials are graduated in 0.001 inch increments with full turn movement of 0.100 inch. With low range shift engaged to the saddle, the dial has a full turn movement of 0.010 inch with each graduation 0.0001 inch. For more data circle 84 on Postpaid Card

★ modern machine shop ★

AUTOMATIC LATHE COMBINES ROUGH AND FINISH OPERATIONS

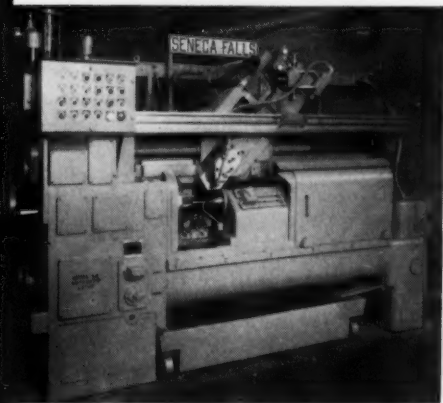
Completely automatic Model Q Tracer Lathes, designed for high level performance in rough and finish turning shafts, have been introduced by The Seneca Falls Machine Co., Seneca Falls, N. Y. The Models LQ and AQ Automatic Lathes combine the advantages of multiple tooling for

rapid stock removal and single tool tracer turning for accurate finishing operations. The operator simply loads shaft between centers and pushes the starting button. Multiple tools turn, then retract, after which the tracer tool finish turns and retracts to the starting position and the machine is ready for reloading. Multiple tools mounted on a rear carriage accomplish the roughing operation while finish turning is done with single, tracer controlled tool on one or more overhead carriages. This method permits extremely close tolerances since the pressure of the single, tracer controlled tool is constant over the entire length of the workpiece and allows full advantage of the higher cutting speeds now possible with carbide and oxide tool materials. In addition, lathes may be automated by automatic loading and transfer equipment.

The electro-mechanical tracer unit on the Model Q Lathes responds very rapidly and with great fidelity to dimensional changes in the template. Idle time is reduced to a minimum by forward and reverse rapid traverse with tracer slide. Rapid traverse movement is independent of the tracer system and is automatically operated by electric clutches through contractors mounted on the control drum.

Models LQ and AQ Lathes have been designed for simplified change-over to reduce setup time. Feed rate may be changed automatically during the cutting cycle. Chip disposal may be handled by any one of three methods: the floor underneath the machine may be cut away for the chips to fall through onto a central chip conveyor; rollaway pans may be supplied to fit underneath the bed of the machine; individually motorized chip conveyors may be installed underneath the bed and arranged to evacuate the chips into tote boxes.

For more data circle 85 on Postpaid Card



Seneca Falls Model LQ Automatic Lathe

new shop equipment . . .

DRIVE UNIT FOR WORK HELD BETWEEN CENTERS

Ideal Industries, Inc., 1031-B Park Ave., Sycamore, Ill., is offering a machine tool accessory for holding work between centers; the Ideal Driving Center. Operation of the driving center depends upon basic hydraulic and

friction principles to grip one end face of work held between centers, without the use of chucks, clamps or dogs.

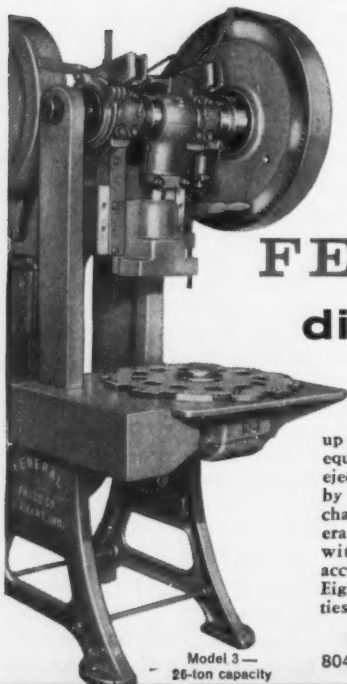
The driving action makes use of a circular chamber filled with hardened steel balls, into which the back ends of a group of driving pins are pressed when the driving center is in operation. The balls act as a fluid, distributing pressure equally to all the driving pins and locking them and the

centering pin securely when the driving points have been driven into the work face.

The Ideal Driving Center provides a rigid direct drive, without backlash. There are no problems with slack or chatter, and the unit functions equally well with uniform workpieces, rough castings, forgings and other uneven shapes or surfaces. Complete end to end machining can be done without removing the work from the machine, and work can be loaded or unloaded without stopping the machine.

Ideal Driving Centers are available to fit Morse tapers Nos. 2 to 6, work diameters from 0.407 inch to 6.375 inches.

Gain the economies of AUTOMATION!



Model 3 —
26-ton capacity

NEW chain- driven FEDERAL dial feeds

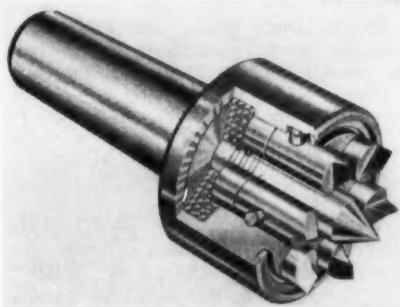
Federal Dial Feeds eliminate the need for specialized, costly machinery; step up production many times. May be equipped with automatic feeds and ejectors. Rotating table is driven by automotive timing gear-type chain. Index and work plates operate on thrust bearings. Shot pin with tapered bushing assures accuracy. Rugged. Precision built. Eight sizes. Six to eighty ton capacities. Call your dealer or write today.

FEDERAL PRESS CO.
804 Division St., Elkhart, Indiana

FEDERAL DIAL FEED PRESSES

33 Years' Experience in Dial Feed Engineering and Construction

For more data circle 439 on Postpaid Card



Ideal Drive Unit holds work between centers

These driving centers can be operated as companion units with the Ideal line of live centers.

For more data circle 86 on Postpaid Card

★ modern machine shop ★

CROSS SLIDE TABLE FOR USE ON DRILL PRESSES

A cross slide milling table has been added to the Palmgren line, manufactured by Chicago Tool and Engineering Co., 8399 South Chicago Ave., Chicago 17, Illinois.

The Palmgren No. 192 Cross Slide Milling Table is 18 inches long and 9 $\frac{1}{8}$ inches wide. Longitudinal travel is 11 inches and the cross feed is 6 $\frac{1}{2}$ inches. Large, easy to read dials are graduated in thousandths. Net weight of the No. 192 Table is 133 pounds.

This table has been especially designed for use on drill presses to perform milling operations. Cross slides are scraped and provide wide foundation surfaces. The Palmgren No. 192 Milling Table has a machined and ground work surface with center keyway and two tee slots. An extra tee slot is provided on one vertical side of



**HORIZONTAL
or VERTICAL**



**Model
"400"**

**4"
ABRASIVE
BELT GRINDER**

Eliminate costly hand filing, grinding and deburring... 17 abrasive belt grinders available for "101" applications in your plant. Write for bulletin.

Hammond Machinery Builders

1615 DOUGLAS AVENUE KALAMAZOO 34 MICHIGAN

For more data circle 440 on Postpaid Card

BETTER WAY TO CLEAN DIES and individual metal PARTS



For
• PRODUCTION
• MAINTENANCE

**MODEL
TR 78**
with filter
and pump
\$294.00

Get a GRAYMILLS AGITOR Parts Washer

1. No heating, no vapor
 2. Flush chips and dirt from metal parts with filtered solvent
 3. Clean out blind holes and cavities
 4. Do it thoroughly, fast and safely
- 152
- Send for catalog and prices

GRAYMILLS CORP. 3149 N. Lincoln Ave.
Chicago 13, Ill.

For more data circle 441 on Postpaid Card

modern machine shop 187

new shop equipment . . .



Palmgren Cross Slide Milling Table

the work table, which can be used to make an angle plate. The table has stops for both cross feeds.

For more data circle 87 on Postpaid Card

★ modern machine shop ★

TWO TON PUNCH PRESS

Alva Allen Industries, Dept. MM, Clinton, Mo., has announced its

Model BHS-2 Two Ton Bench Type Punch Press, which can perform small tonnage types of operations.

The Model BHS-2 has a 7 inch high shut height. It can be used for any standard punching operations, in many various materials, within rated capacity. Type of work performed is limited only by the ultimate in dies. The main frame is of high quality grey iron with strong uprights and liberal reinforcing ribs, which assures maximum strength and rigidity. The Model BHS-2 Crankshafts — turned, ground and polished—are of special carbon, high manganese steel, ideal for press shafting, and are resistant to load and



170 STYLES and SIZES IN STOCK

For automatic screw machines and turret lathes. The lapped finish on the hard knurling surface contributes to outstanding performance and longer life.



We're constantly helping manufacturers solve their special knurling problems. Let us help with yours. Prices for special knurls quoted upon receipt of blueprints or detailed specifications.

**SPECIAL
KNURLS**
Made to Order

WRITE FOR
KNURL BULLETIN

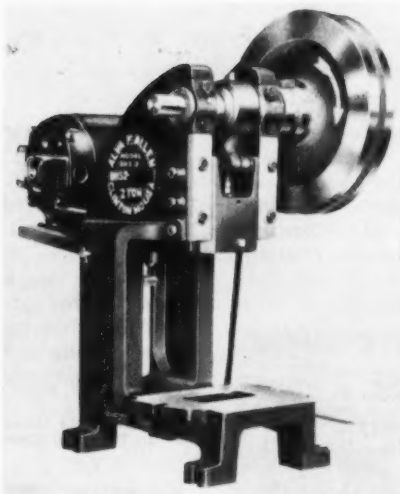
REED ROLLED THREAD DIE CO.

Specialists in Thread and Form Rolling Tools and Equipment

WORCESTER 1, MASSACHUSETTS, U. S. A.

K-183

For more data circle 442 on Postpaid Card



Alva Allen Model BHS-2 Punch Press

shock. The quick action clutch is of single pin, positive, non-repeat or repeat action design. All contact parts are scientifically heat treated, giving a hardness for long lasting life. The straight ram guides, extra long with ample provision for lubrication, assure long life of dies. Flat gib allows for take up of wear. Standard stroke is $\frac{3}{4}$ inch with $\frac{1}{4}$ to $1\frac{1}{2}$ inch strokes available. The flywheel, for the vee belt drive, has a recommended speed of 300 r.p.m. and requires only a $\frac{1}{3}$ horsepower motor.

For more data circle 88 on Postpaid Card

★ modern machine shop ★

FINISHING AND ROUGHING BARS

The Robert H. Clark Co., 9330 Santa Monica Blvd., Beverly Hills, Calif., has announced the availability of finishing and roughing bars, which have been designed to minimize setups and

expedite adjustment and blade exchanges without removing the bar from the machine.

A floating mount permits the chip load to balance between the two cutting edges, producing a smooth surface on precision finishing operations.

GRIND THE *Eastern Centerless Way*

WE SPECIALIZE
20 CENTERLESS GRINDERS
ESTABLISHED 1939

Eastern Centerless Grinding Co.
470 Tolland Street East Hartford 8, Conn.

For more data circle 443 on Postpaid Card

CUT YOUR TOOL COSTS!

END MILLS

Completely Reconditioned
for as little as--

60c

--per end, $\frac{1}{2}$ " diameter and smaller.
All other sizes proportionate.



This new, special, low cost service includes cutting off broken ends, recutting ends, sharpening, and backing off diameters. Delivered plastic coated for protection.

Any quantity accepted at above money-saving price. And, CTR pays return shipping cost.

**FAST DELIVERY
GUARANTEED**

Send in a trial order--NOW.

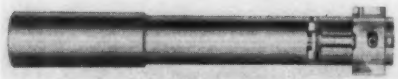


CTR SALES AND GRINDING CO.
SINCE 1919
1335 N. HALSTED ST. CHICAGO 22, ILL.

For more data circle 444 on Postpaid Card

new shop equipment . . .

Blades are adjustable, covering a wide range of bore sizes and allowing for numerous regrinds. Several blade sizes are available for each bar. Inside faces of blades are serrated and made to allow longitudinal adjustment without skewing. Expansion or contraction of bore size is controlled by an inter-



R. H. Clark Finishing and Roughing Bar

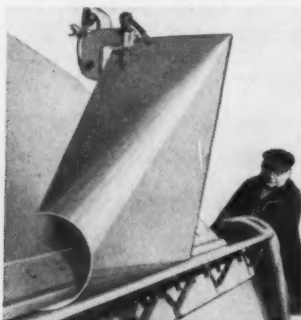
nal socket head set screw. Size is attained by miking across blade edges while adjusting or by grinding to diameter. Cutting blades are furnished in M-3 type high speed steel or carbide tipped to insure long life and greater number of cuts.

For more data circle 89 on Postpaid Card

Bending Steel Plates for WELDMENTS?

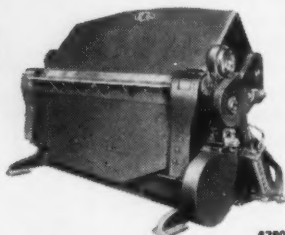
do it economically with

CHICAGO® BENDING BRAKE



Many standard sizes are available with capacities for bending mild steel up to 12 feet by $\frac{3}{4}$ inch or 16 feet by $\frac{1}{2}$ inch.

The elimination of die costs and the ease of changing from one job to another make the CHICAGO bending brake the economical method for bending steel plates for weldments. An automatic stop regulating the degree of bend assures duplication on successive pieces.



6780

For details on how to do it, ask for Bulletin P-55



Press Brakes • Straight-Side-Type Presses • Press Brake Dies
Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP

MANUFACTURING CO.

7418 South Loomis Boulevard, Chicago 36, Illinois

For more data circle 445 on Postpaid Card

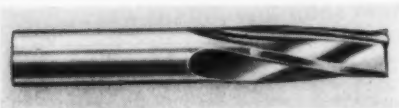
★ m m s ★

SPIRAL FLUTE END MILLS

A series of spiral fluted end mills was recently introduced by the Atrax Co., Newington 11, Connecticut.

These Series 1505 End Mills can be run at slow speeds without injury to the cutting edge. They are especially recommended for machining stainless steels, stellite, titanium nickel, chrome, monel metal and other high temperature steels.

There are 16 individual end mills available in this series. Features



Atrax Series 150S Spiral Flute End Mill

include four flutes, single end, straight shank, right hand spiral and right hand cutting.

Fractional sizes range from 1/16 inch cutter diameter to 3/4 inch; the overall length ranges from 1 1/2 to 4 inches.

For more data circle 90 on Postpaid Card

★ m m s ★

PRECISION BORER

Greenlee Bros. and Co., 1881 Mason Ave., Rockford, Ill., has announced a larger capacity Hydro-Borer, which is known as the Model S-7. It is a precision borer for large assemblies or small individual pieces.

The S-7 Hydro-Borer is unusually compact for its heavy feed capacity. Overall dimensions are 34 1/2 inches in length, 7 3/4 inches high and 5 1/2 inches wide. Spindle diameter is 1 3/4 inches with a No. 3 Morse taper. Length of stroke

is 6 inches. Feed per revolution is 0.0035 inch reducible to 0.002 inch.

Revolutions per minute are 465, 900 and 1,400. The Model S-7 has been specifically designed for mounting on workholding fixtures or large assembly jigs.

The Greenlee Model S-7 Precision Hydro-Borer features a feed principle which enables the S-7 to bore to close tolerances with a good quality finish. Low maintenance costs are assured

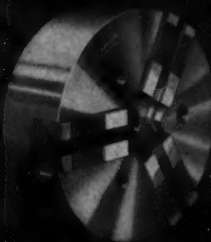
cut floor-to-floor time...

assure accuracy...

with



POWER CHUCKS and ROTATING CYLINDERS



S-P POWER CHUCKS. Self-centering or compensating. American Standard or serrated. 2 or 3 jaws. Sizes, 6 to 18 in.

Famous S-P cam and lever design

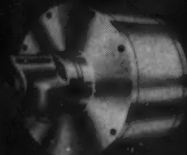
- grips work tighter, resists jaw opening under load
- longer jaw travel, balanced for high rpm.
- flame hardened master jaw ways

Installed as original equipment by leading tool manufacturers

S-P ROTATING CYLINDERS. Sizes, 3 to 16 in. bore (air), 3 to 8 in. bore (hydraulic, 500 psi).

Air and hydraulic

- weight-saving design, long stroke, compact inlet
- balanced for high rpm, American Standard mountings, finished adapters available



Representatives in principal cities. Phone or write for Catalog No. 112



for speed
and
performance

THE S-P MANUFACTURING CORPORATION

OLON, OHIO



NON-ROTATING AIR AND HYDRAULIC CYLINDERS • ROTATING AIR AND HYDRAULIC CYLINDERS • POWER CHUCKS • COLLET AND DRILL PRESS CHUCKS • VALVES, ACCESSORIES

A BASSET COMPANY • IN GREATER CLEVELAND • ESTABLISHED 1916

AA-768

For more data circle 446 on Postpaid Card

NIBBLE *Your* **COSTS**
 WITH ...
SAVAGE
NIBBLING MACHINES

- TUBE CUTTING
- CIRCLE CUTTING
- STANDARD NIBBLING
- FREE-HAND or TEMPLATE CUTTING
- SPEED WITH ACCURACY
NO SECONDARY OPERATIONS
- SPEED WITH SAFETY
NO OPEN FLAME OR SPARKS



Up to $\frac{3}{4}$ " Capacity
in MILD STEEL

QUOTATION ON REQUEST
W.J. SAVAGE COMPANY
 KNOXVILLE TENNESSEE
 NIBBLING MACHINE PIONEERS

For more data circle 447 on Postpaid Card

Peaslee **ACTUAL SIZE**



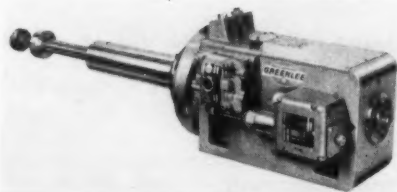
PRECISION MINIATURE PINS

Our quantity production of standard-size, precision, stainless-steel pins is now expanded to miniature pins. Tolerances are held to .0002 on dia. Sizes run as small as .020 dia. x $\frac{1}{16}$ ". Both straight and taper styles are produced, with taper pins ranging down to 9/0. We specialize on stainless-steel, instrument-type pins. Send your blueprints for prompt quotation.

THE PEASLEE METAL PRODUCTS CO.
 470 Tolland Street • East Hartford 8, Conn.
 For more data circle 448 on Postpaid Card

192 modern machine shop

new shop equipment . . .



Greenlee Bros. Model S-7 Hydro-Borer

due to simple, rugged construction. It consists of a cylinderhousing, oil reservoir, bearings, boring spindle assembly, control valve and spindle drive assembly.

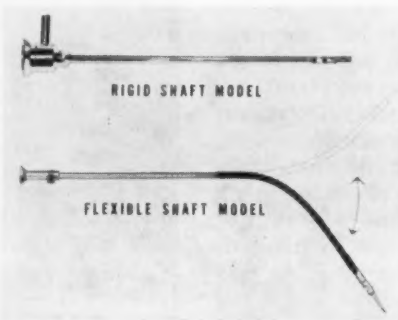
The Model S-7 Hydro-Borer can be equipped with manual, solenoid or air operated controls.

For more data circle 91 on Postpaid Card

★ modern machine shop ★

HIGH PRECISION OPTICAL INSPECTION INSTRUMENT

Size Control Co., 2500 West Washington Blvd., Chicago 12, Ill., is now



Bore-O-Scope Optical Inspection Device

June, 1958

offering an optical inspection instrument called the Bore-O-Scope, which enables the user to inspect any hidden surface that the eye cannot reach.

The Bore-O-Scope is a high precision optical instrument that will solve many difficult inspection problems in both manufacturing and maintenance.

It is available in various diameters, lengths and angles of vision. The light source for the optical instrument is supplied by several types of lamps, depending upon the size of the Bore-O-Scope and the angle viewed. Lamps operate on power supplied by accessory units from 2½ volts and up. A direct beam of light is normally used, instead of diffused lighting. Bulbs are protected from breakage by a sturdy metal housing and construction has been designed in accordance with standard safety procedures. Special Bore-O-Scopes are available for use in inspection under water or immersion in other liquids. The instruments are completely sealed at the objective and ocular ends.

The Bore-O-Scope is available in sizes from 3/16 inch o.d. and up

in a complete range of lengths from 8 inches to longer than 15 feet.

It has been designed to conform to specifications requiring the finest optical glass polished to the closest commercial optical tolerances.

All mirrors and lenses are coated with anti-reflective magnesium fluoride which allows for maximum light transmission. The hard protective coatings on mirrors prevent



**HAVE YOU
CHECKED YOUR
COUNTERSINKING
COSTS LATELY?**

**A Severance
CARBIDE ECONO-SINK
WILL GIVE YOU -**

- INCREASED ACCURACY
- MORE PRODUCTION
- SMOOTHER SEATS
- LONGER CONSISTENCY OF OPERATION
- LESS DOWN-TIME
- AND A COMPLIMENT FROM THE BOSS FOR SUGGESTING THE CHANGE



CHATTER-FREE DESIGN
Solid CARBIDE CUTTING HEADS

CARBIDE ECONO-SINKS

MAKE THE Switch to Carbide BEFORE IT'S TOO LATE



MIDGET MILLS

REGRINDING

INSIDE DEBURRING CUTTERS

OUTSIDE DEBURRING CUTTERS

HAND DEBURRING CUTTERS

TUBE END DEBURRING CUTTERS

WITH THE NEW Severance CARBIDE ECONO-SINK YOU GAIN ALL THE ADVANTAGES OF CARBIDE TOOLING - AND AT LESS COST per Countersunk Hole

Ask for a Severance catalog today!

**Representatives and Distributors
in Principal Industrial Areas.**

Severance TOOL INDUSTRIES INC.
724 IOWA ST. • SAGINAW, MICHIGAN



CARBIDE HAND FILES



SPECIAL CUTTERS



MICRO-MILLS & BORE-MILLS



BALL SEAT REAMERS

For more data circle 449 on Postpaid Card

new shop equipment . . .

damage to reflecting surfaces of same by dirt and grit.

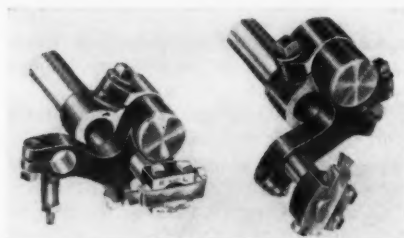
For more data circle 92 on Postpaid Card

★ modern machine shop ★

COMBINATION SWING TOOL CUTS RIGHT OR LEFT

A precision tool for turret lathes and screw machines, which is adaptable for right or left hand cutting, has been introduced by R and L Tools, 1825 Bristol St., Philadelphia 40, Pennsylvania.

Described as the R and L Combination Swing Tool, the design permits straight, taper or irregular turning when cross slide tools are in use for other operations. It can be easily



R and L Combination Swing Tool. (Left) Tool is adjusted for left hand cutting; (Right) tool is adjusted for right hand cutting

changed for right or left hand cutting by simply moving the holder from one location to the other (see illustration) and using the required blade. Two high speed cutting tools are furnished.

Construction of the tool is of heat treated alloy steel for maximum strength. All holes are ground for accurate alignment.

For more data circle 93 on Postpaid Card

People work better when they SEE BETTER®



AT IBM

IBM model shop worker using MAGNI-FOCUSER on a filing operation for a business machine part at the company's Endicott, N. Y. plant.

MAGNI-FOCUSER

SPEEDS PRODUCTION
With Third Dimensional (3-D) Vision
Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

MAGNI-FOCUSER

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

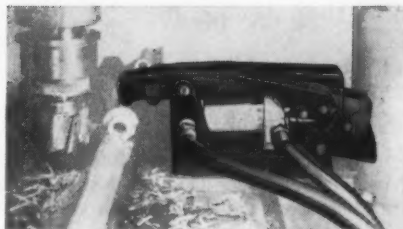
EDROY PRODUCTS CO. 480 Lexington Ave., Dept. P, New York 17, N. Y.

For more data circle 450 on Postpaid Card

AIR OPERATED CLAMP

Lodding, Inc., Worcester 1, Mass., is marketing an air operated, automatic, heavy duty clamp. It delivers ten times the line pressure and is cam-locked to hold the clamp locked in the event of air failure. By locating the air cylinder under the clamp, unusual compactness has been achieved. The dimensions are 3 inches wide, $3\frac{5}{8}$ inches high and $8\frac{1}{4}$ inches long.

For more data circle 94 on Postpaid Card

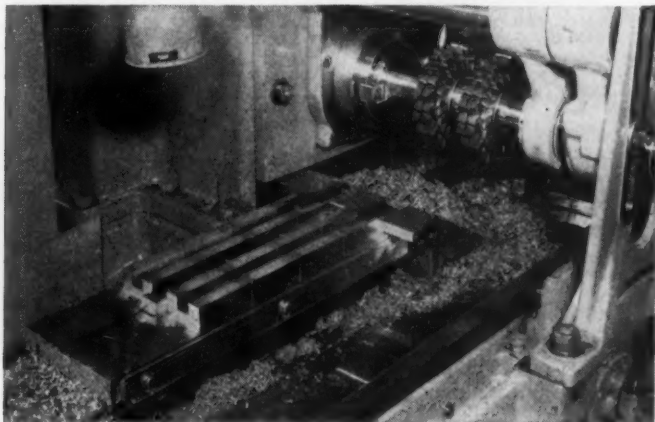


Lodding Air Operated Automatic Heavy Duty Clamp is unusually compact

O. S. WALKER

CERAMIC MAGNET CHUCKS . . .

*for fast
milling
set-up!*



New Walker extra-power permanent ceramic magnet chucks* are now being used to practically eliminate set-up time on high speed gang milling operations. There are big savings in operating costs too.

Profit from—

- Increased operating speed
- Automatic demagnetization of cutter and work
- Designed-in dimensional stability
- Low chuck height and weight
- Low initial cost
- Almost no operating cost

The use of ceramic magnet chucks as basic milling and grinding fixture plates promises even greater operational savings. For milling applications, a bottom plate with key slots is recommended.

Call your local dealer or O. S. Walker for details.

**Patent applied for*



O. S. WALKER COMPANY, INC.

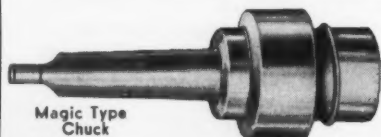
WORCESTER 6, MASSACHUSETTS, U. S. A.

For more data circle 451 on Postpaid Card

new shop equipment . . .

SMALL BORE GAGE AND DRILL GRINDER

Alina Corp., 122 East Second St., Mineola, L. I., N. Y., has announced its Bore-Test which is a compact and highly versatile comparator. It will indicate taper, bellmouth, out of round and other dimensional varia-



THE COLLIS MAGIC-TYPE CHUCKS

Reduce production costs with Collis Magic Chucks. Now tools can be changed without stopping or slowing down the spindle. Boring, counter boring, drilling, reaming, tapping, etc., can be performed practically continuously.

Let our 40 years of manufacturing experience help your customers select the proper equipment for the job.

"Call Collis For Service"

THE COLLIS CO.

Dept. A, Clinton, Iowa

For more data circle 452 on Postpaid Card

196 modern machine shop

tions of bores ranging in size from 0.057 through 0.810 inch. This instrument may be used in blind or multiple holes with confidence. A wide variety of measuring heads are used with each gage. The heads may be quickly interchanged without the use of keys or wrenches. Each measuring head is hardened and chrome plated to provide long lasting accuracy. Simple design and rugged construction combine to provide an instrument that remains reliable even under the most adverse conditions.

The company has also announced a new line of drill grinders which perform any drill grinding job in a matter of seconds. The Select-O-Point Drill Grinders have been designed for rapid and accurate grinding of twist drills, step drills, spotfacing cutters, keyway milling cutters, end mills, screw taps and reamers. Each drill grinder is a complete system built around a planned drill point. Applied to twist drills, this drill point will increase the useful life of drills, reduce the drill thrust force, eliminate the need for center punching, produce a rounder and more accurate hold and, on the larger drills, afford a drill point that will produce a round and almost



(Left) Alina Bore-Test Comparator and
(Right) Select-O-Point Drill Grinder

June, 1958

burr-free hole in sheet metal. The three models have ranges from 0.080 inch through 1.250 inches.

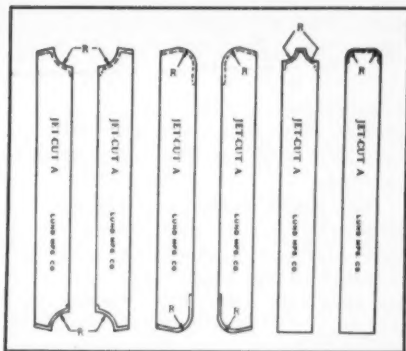
For more data circle 95 on Postpaid Card

★ modern machine shop ★

RADIUS TOOL FOR TURNING OPERATIONS

Lund Manufacturing Co., 8 Music Hall Ave., Waltham 54, Mass., has announced the introduction of a standard line of Jet-Cut A Radius Tools for turning operations.

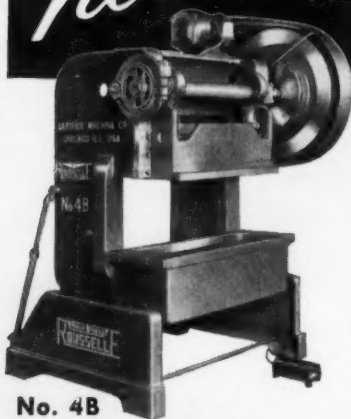
The manufacturer states that these tools are said to make possible savings to manufacturers performing turning operations on lathes, turret lathes and automatic turning machines.



Lund Jet-Cut A Radius Form Tools

Jet-Cut A Tools are made from a super high speed steel, recommended for long life on operations requiring toughness and a fine cutting edge. Six

New 40-TON DOUBLE CRANK O. B. I. ROUSSELLE

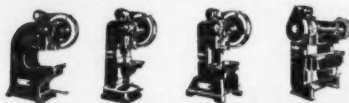


No. 4B
ROUSSELLE PRESS

WITH NEW ELECTRICALLY CONTROLLED AIR CLUTCH

- "Plug-in" foot and hand controls.
- Single stroke, continuous and jog selector.
- Low air consumption.
- Large die area.
- Roller bearing flywheel.
- Bronze main and crank bearings.

CHOICE OF 30 SIZES AND TYPES IN 5 TO 40-TON PRESSES



SERVICE MACHINE CO.

Mfrs. of Roussele Presses
2310 WEST 78th STREET • CHICAGO 20, ILL.

ROUSSELLE PRESSES ARE SOLD EXCLUSIVELY THROUGH LEADING MACHINERY DEALERS
For more data circle 453 on Postpaid Card

new shop equipment . . .

styles of concave and convex tools are offered, with radii from 1/32 to 1/16 inch by 64ths, and up to 11/16 inch by 32nds.

Tool shank sizes available are 1/4, 3/8, 1/2, 5/8 and 3/4 inch square. Both right and left hand cutting tools are included in the line.

For more data circle 96 on Postpaid Card

GET THE FACTS

About Hardness Testing

Everything you need to know about hardness testing is told in this handsome book, prepared by the makers of the internationally respected CLARK Hardness Testers for "Rockwell Testing." Simple, easy-to-read text (in English) and numerous illustrations show the equipment and procedure for fast, accurate hardness testing of ferrous and non-ferrous materials. If you would like a copy, *free of charge*, just attach this ad to your letterhead or write "Send book." A copy will be mailed to you promptly.

P.S. If you are interested in descriptions and prices for CLARK Hardness Testers (Standard and Superficial) of *guaranteed accuracy*, say the word and we'll gladly supply them.

CLARK
INSTRUMENT INC.

CLARK INSTRUMENT INC.

10204 Ford Road • Dearborn, Mich., U.S.A.

For more data circle 454 on Postpaid Card

198 modern machine shop

PORTABLE STOCK RACKS

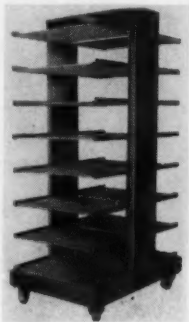
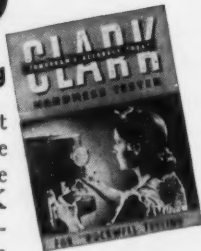
The Challenge Machinery Co., MMS-3, Grand Haven, Mich., has announced its portable stock racks. These provide 30 to 40 square feet of movable storage space in just a few square feet of storage space.

They are ideal for operations involving the storage and movement of stock, small parts, pieces or paper stock and the movement between various assembly or processing, repair

or servicing operations. Large rubber tired casters permit easy movement between places even when fully loaded. Removable masonite shelves—two to each level—add to versatility. The racks are of heavy gage steel.

Two sizes are available: Model A with 20 by 27 inches of space on each level and Model B with 22 by 34 inches.

For more data circle 97 on Postpaid Card



Challenge Stock Rack

June, 1958

COMPARATOR FOR INSPECTING EDGES OF TURBINE BLADES

Jones and Lamson Machine Co., Dept. 710, 521 Clinton St., Springfield, Vt., has announced a comparator for inspecting leading and trailing edges of turbine blades and vanes.

The need for accuracy of edge contour and fairing of edge contour with air foil contour, on turbine blades and

vanes, resulted in the design of this 14 inch bench comparator.

It incorporates two high intensity illuminating units, mounted on the hood of the machine—and a manually operated, blade orienting fixture with an adjustable locating vee and built in knife edge.

The light is projected, through cone type light tubes, past the knife edge, onto the blade to be inspected. The



ETALON INGAGE

measures the
exact BORE or
blind hole size!

Reading: .0001"

Size 3/16" to 4"

Takes accurate measurements of blind holes. No masters or setting rings—measures directly—by .0001".

Automatic alignment, rectangular contact points guarantee extreme accuracy even when fully extended. Immediately detects out of round holes; with extensions measures holes up to 6 feet deep. Hardened contact points exert minimum pressure—will not damage fragile work.

Easy to read, deep graduations on a large diameter thimble. Dull chrome plated. Furnished in English or Metric graduations, individually or in sets.

WRITE FOR CATALOG on complete line of precision measuring instruments: VERNIER CALIPERS, MICROMETERS, DIAL INDICATORS.



ALINA
CORPORATION
122 East Second St.
Mineola, L. I., N. Y.

For more data circle 455 on Postpaid Card

new shop equipment . . .

straight line shadow thus formed can be inspected, on the viewing screen, as a cross sectional view of the blade edge contour. The blade may be moved to and from the lens, in the locating vee, allowing inspection along the entire length of the blade. A special visor affords easy viewing of the projected image at all times. Design of the fixture permits inspection of blades

with chord lengths up to $5\frac{1}{2}$ inches and overall blade lengths from 1 to 9 inches. Manual rotation of the blade in the vee provides alignment of the image on the viewing screen.

For more data circle 98 on Postpaid Card

★ modern machine shop ★

GAGE BLOCK SET

Many measuring instruments, such as optical comparators, toolmaker microscopes, coordinate measuring

stages, as well as precision machines including small jig borers, require simple gage blocks to extend their initial range.

To make a few basic sizes of gage blocks available for this particular application, Opto-Metric Tools, Inc., 137-MM Varick St., New York 13, N. Y., has announced a seven block set of gage blocks consisting of one each block $1/16$, $1/8$, $1/4$, $1/2$,

*How fast do you
want to drill...*

10,000 RPM
MAYBE
15,000 OR
20,000 ?



Oil-circulating head with vertical adjustment spindles.

U. S. Drill Heads are designed to drill as fast as you need—and still maintain accuracy!

The rugged Fixed Center Head shown is a full ball bearing, oil-circulating model with built-in pump. It operates regularly in production at 15,000 rpm with very little heat! As in all U. S. Heads, shaved gears assure quiet, smooth operation—at all speeds. Write for catalog FC-57.



Adjustable and Fixed Center Multiple Drilling Heads.
Individual Lead Screw Multiple Tapping Heads.

UNITED STATES DRILL HEAD CO.

BURNS STREET • CINCINNATI 4, OHIO

For more data circle 456 on Postpaid Card



**This Opto-Metric
Gage Block Set consists of seven blocks**

1, 2 and 3 inches, including hardwood case. Guaranteed accuracy is plus 0.000006, minus 0.000002 inch.

For more data circle 99 on Postpaid Card

★ modern machine shop ★

HEAVY DUTY VACUUM LIFTER


Vac-U-Mation Division, F. J. Littell Machine Co., Dept. 4-B, 4555 North Ravenswood Ave., Chicago 40, Ill., has announced its latest model in the heavy duty series of vacuum lifts. It is the No. 12651 self-contained power tilt, four cup lifter with 2,000 pound capacity and a substantial reserve of strength. The power tilt gives new versatility to vacuum lifting in that cups are automatically rotated to vertical or horizontal positions, eliminating maneuvering by operation. The lifter is supplied complete and ready for operation by simply plugging into the proper electric outlet.

This model brings to vacuum lifting a new capacity, providing a line of models to meet any common sheet handling requirements. Being crane

suspended, sheet or plate can be handled by crane for warehouse or storage stacking, while free suspension permits positioning by operator for press or other machining operations in line production.

The power and control units are built into a crane mounting housing from which two dual lifting aluminum web feet or cup arms extend supported on a 3 inch diameter steel shaft. Each of the four cups has a capacity of 500 pounds. Operation of these cup arms for rotary or horizontal move-

FOR PRECISION MACHINING
TO CLOSE TOLERANCE



Precise

SUPER 60 POWER QUILL

High speeds combined with high torque make PRECISE Super-Speed POWER QUILLS the finest tools for precision grinding, milling, and finishing. They can be quickly mounted—with PRECISE mounts—on standard and special machine tools to do the work of single-purpose machines costing many times more.

PRECISE Super 60 POWER QUILL provides spindle speeds up to 45000 rpm with a ½ hp motor and operates from ordinary 110v or 220v power supplies. Its rigid steel housing, precision spindle, and collet chuck permit work tolerances to within .0001 inch. Other models available from 7000 rpm to 45000 rpm with power ratings to 1½ hp. Send for complete catalog.

Precise

Power Quills Grinder Millers Milling Machines Accessories Cutting Tools Vapor-Lub Cooling Systems
Quality and Precision Since 1882

PRECISE PRODUCTS CORPORATION
3745 BLUE RIVER ROAD, RACINE, WISCONSIN, U.S.A.
BRANCH PLANT: PRECISE G.m.b.H., DUESSELDORF, GERMANY

For more data circle 457 on Postpaid Card

new shop equipment . . .

ment is provided by a power transmission assembly of a gear reducer, spur gears and Keller air motor.

Vacuum lifting and release are provided respectively by an oilless type twin cylinder, high volume, dry vacuum pump, belt driven by a $\frac{3}{4}$ h.p., 440 volt, three phase, 60 cycle motor, and an oilless type twin cylinder, 175 pound, two stage air compressor, also belt driven by a $\frac{3}{4}$ h.p., 440 volt, three phase, 60 cycle motor.

The guiding handle, designed for greatest flexibility of handling, is ratchet controlled for positioning at various heights as the lifter is raised or lowered. Design of controls and indicator lights provides easy manipulation with utmost safety. The switch

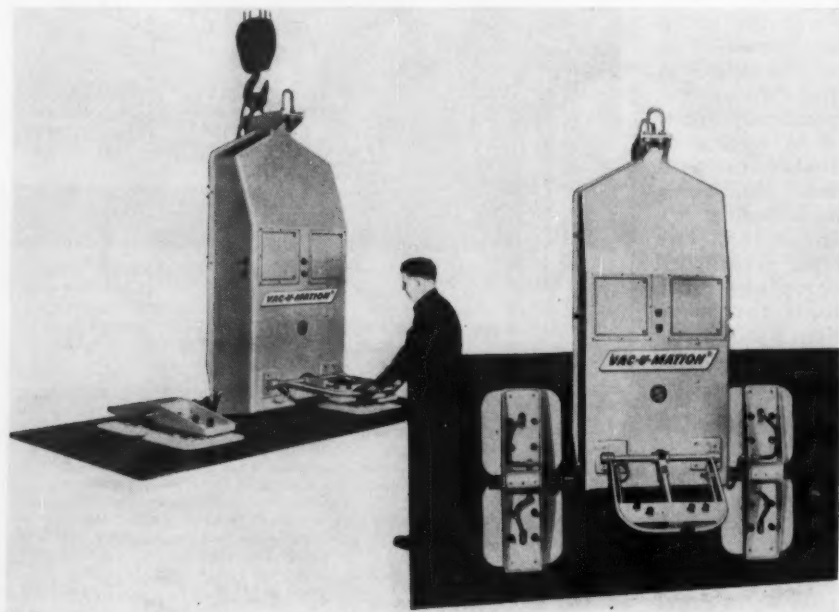
for starting and stopping the two motors operating the air compressor and vacuum pump, for instance, is located above the nameplate on the housing. The indicator light, just above this switch, indicates when the motors have been turned on. Sets of indicator lights on each side of the lifter show when vacuum has been applied to the cups and is ready to lift. Green or red shows whether vacuum has been applied, providing visual safety warning in operation.

For more data circle 100 on Postpaid Card

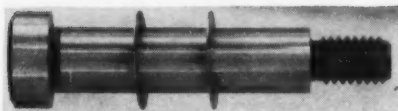
★ modern machine shop ★

STRIPPER BOLT SHIM KIT

AlSCO Co., 1770 Stone Rd., Rochester 15, N. Y., has announced the addition of a stripper bolt shim kit to its line



Littell No. 12651 Heavy Duty Vac-U-Mation Sheet Lifter has 2,000 pound capacity



Also Stripper Shim fits standard bolts

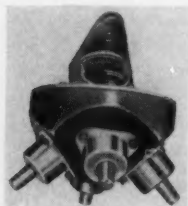
of toolroom aids. These shims fit standard bolts and eliminate the need for the recounterboring or turning of bolts, while maintaining stripper height when sharpening dies. They are made in several thicknesses, which allow for any combination that may be required.

For more data circle 101 on Postpaid Card

★ m m s ★

DRILL AND TAP HEADS

Chicago Quadrill Co., 1854 Busse Highway, Des Plaines, Ill., has announced two new sizes in its line of Quad-drills — four position drilling and tapping heads. The new Quadrills



Chicago Quadrill
Drilling and
Tapping Head

have an expanded quill sleeve designed to fit the larger size quills on 15 and 20 inch Delta Drill Presses.

For more data circle 102 on Postpaid Card

★ modern machine shop ★

4 TON BENCH PRESS

Described as ideal for forming, trimming and force-fit assembly opera-



Same lathe,
same operator—but
production way up!

+6F+ Work Driver makes the difference!

For turning between centers, simply mount the famous +6F+ Work Driver on your present lathes. Eliminate driving dogs, forget about hand wrenching. Drive rough or smooth blanks—even improperly centered forgings—with a steady, evenly distributed force.

An easy half-turn of the hood does the clamping—and the clamping force *always* matches the cutting pressure. Five models give you diameter capacities of 1/4" to 8-1/16".

Skinner Chuck Company is national distributor for the +6F+ Work Driver. Sales are handled through Industrial Distributors, Machinery Dealers, and Machine Tool Builders.

Write for bulletin with full details and specifications. Dept. 176.



THE SKINNER CHUCK COMPANY

Established 1887

NEW BRITAIN, CONNECTICUT

For more data circle 458 on Postpaid Card

"TORQUE WRENCH" MANUAL

Sent
upon request

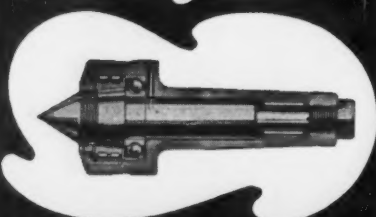
Formulas
Applications
Engineering data
Screw torque data
Adapter problems
General principle

P.A. **STURTEVANT** CO.
ADDISON **QUALITY** ILLINOIS

Manufacturers of over 85% of the torque wrenches used in industry

For more data circle 459 on Postpaid Card

NIELSEN Heavy Duty Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog
M on live centers

NIELSEN, INC. LAWTON, MICHIGAN

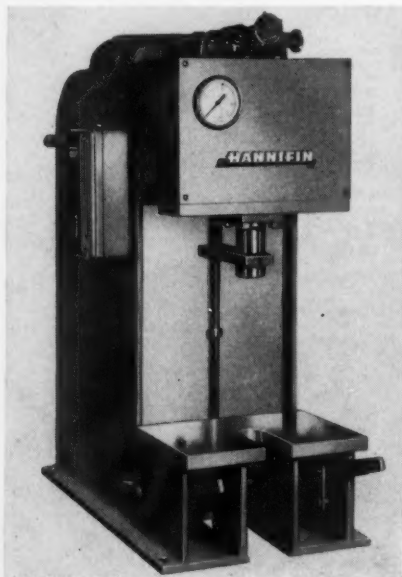
For more data circle 460 on Postpaid Card

204 modern machine shop

new shop equipment . . .

tions, a high speed bench press has been announced by Hannifin Co., 565 South Wolf Rd., Des Plaines, Ill. Dual hand control and adjustable down stroke control are standard on the press; and electric pushbutton controls with or without pressure reversal are available. Return stroke is adjustable in all models. This permits shortening the work cycle to where the ram just clears the workpiece on repetitive operations. Tonnage is also adjustable, from 10 percent of capacity to full rated capacity.

The press stands 39 inches above the bench or other surface on which it is used—on a 17 by 30 inch base plate. Stroke is 6 inches; reach from throat of frame to centerline of ram is 6 inches; and gap is 12 inches. The removable table is 14½ inches wide



Hannifin 4 Ton High Speed Bench Press

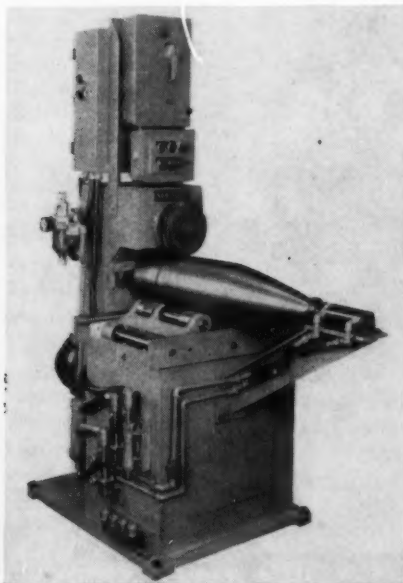
June, 1958

by 10 inches deep, and its top is $8\frac{1}{4}$ inches above the mounting surface. The 4 ton model has the following speeds: Down, advance, 700 i.p.m.; Down, feed, 330 i.p.m.; Return, 670 i.p.m. A 2 ton model, with the same frame, motor and pump, is even faster. For more data circle 103 on Postpaid Card

★ modern machine shop ★

MACHINE AUTOMATICALLY MARKS AND KNURLS SHELLS

The Noble and Westbrook Manufacturing Co., 25 Westbrook Ave., East Hartford 8, Conn., has designed and built a fully automatic machine for marking and knurling 8 inch shells at the rate of 200 per hour. The machine has been designed for in-line conveyor installation accepting shells traveling side by side. Loading, marking and



Noblewest Model 494 Automatic Marker

June, 1958

CAM MILLING JIG BORING



A SPECIALIZED CAM MILLING SERVICE. JIG BORING
... SPOT WELDING
... CONTRACT PRODUCTION
EXPERIMENTAL DEVELOPMENT

SEND FOR NEW CATALOG NO. 55-C

EISLER ENGINEERING CO., INC.

734 S. 13TH ST., NEWARK 3, N. J.

For more data circle 461 on Postpaid Card

FROIL Rust Preventive OIL



Positive barrier against corrosion that lasts for MONTHS

Protects any metal—even delicate MICRO-finishes

Eliminates fingerprint damage and water spotting.

Write for Data Sheet No. RP-100
"FROIL FOILS RUST"

15 BANK STREET
STATEN ISLAND 1, N. Y.

For more data circle 462 on Postpaid Card

DORMAN AUTOMATIC REVERSE TAPPERS



- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to $\frac{3}{8}$ " in Steel — $\frac{1}{2}$ " in Aluminum.

No. 2B POSITIVE TAPPER—capacity $\frac{3}{8}$ " to $\frac{7}{8}$ " in Steel.

No. 3A POSITIVE TAPPER—capacity $\frac{1}{2}$ " to $1\frac{1}{4}$ " in Steel— $\frac{1}{2}$ " to $\frac{3}{4}$ " Pipe Taps.

No. 4A TAPPER — capacity $\frac{3}{4}$ " to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from **\$62.00**
Write for Bulletin
IMMEDIATE DELIVERY

THRIFTMASTER PRODUCTS CORPORATION

Division of Thomson Industries, Inc.

1034 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILL HEADS

For more data circle 463 on Postpaid Card

modern machine shop 205

new shop equipment . . .

unloading are fully automatic and continuous. The automatic cycle is actuated by each approaching shell.

Designated as the Model 494, this machine features a welded steel frame, a pneumatic marking pressure system, a motorized roll knurling head and an electro-pneumatic control system. The roll marking or knurling tools

are on a heavy duty, heat treated and ground spindle mounted in anti-friction bearings.

The work table is at a slight angle to the horizontal and is equipped with a dual roller-cradle assembly. The two roll assemblies, the left and right, raise and lower alternately to accept and discharge parts one at a time. These cradles are actuated by air cylinders mounted within the base of the machine. These cylinders applying a

vertical thrust against the roller assemblies furnish the necessary marking pressure for depth of mark or knurl, which is controlled by pre-setting of pressure regulator.

The heart of the control system is a unique step-switch which controls the entire sequence of operation with complete interlock. Manifold mounted air valves are used to facilitate and simplify service. An air control system consisting of pressure regulator, filter, lubricator and gage, is included in the circuit.

Variations of this marking machine can be used to mark and knurl similarly sized large round tubular or solid components.

For more data circle 104 on Postpaid Card



Polishing shaft bearing surface
with Schauer Type NA2C Speed Lathe.

These versatile, low-cost machines handle an almost unlimited variety of work — deburring, lapping, trimming, polishing—on metal and plastic parts. Thousands in use. Many sizes and models with holding devices to suit the job. *Speed production* with Schauer Speed Lathes. Write for Catalog No. 530.

SCHAUER MANUFACTURING CORP.

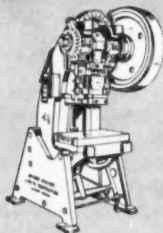
4501 Alpine Ave. • Cincinnati 42, Ohio

For more data circle 464 on Postpaid Card

CONVEYOR TYPE BELT GRINDER COMBINES SIX OPERATIONS IN ONE

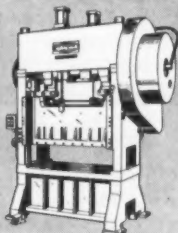
Engelberg Huller Co., 101 West Fayette St., Syracuse 4, N. Y., has announced a conveyor type abrasive belt machine that makes possible six grinding operations in a single conveyorized pass. Designed for high volume flat surfacing of ferrous and non-ferrous metals, plastics, glass, ceramics and other materials, the Engelberg

Model No. 680-6 is equipped with six individually adjustable grinding heads. By using a series of progressively finer grit abrasive belts, unmachined parts can be rough ground, precision sized and machined to a fine, micro-inch finish in one continuous operation. For parts requiring rapid, but exceptionally heavy stock removal, identical belts can be used on each of the grinding heads in order to considerably multiply production rates.



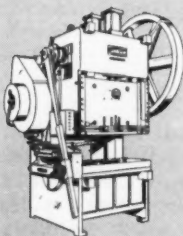
13 models
from 16 to 150
ton

INCLINABLE



Single and
Double Crank from
40 ton to 200 ton

STRAIGHT SIDE

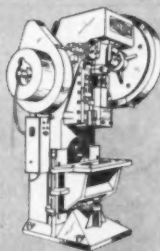


GAP

60 ton
to 200 ton

HORN

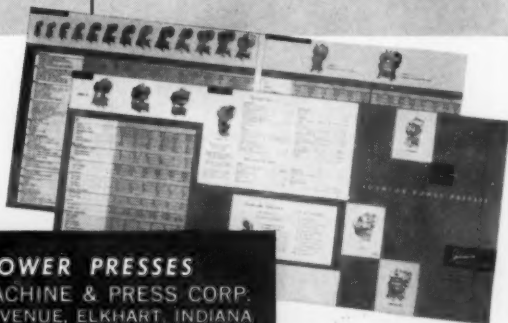
60 ton model
in flywheel and
back geared type



"Specs" on 34 models in
one easy reference folder

Be sure your file has this quick
reference folder on hand. Lists
all models in Inclinable, Straight
Side, Gap and Horn presses.

Write for Bulletin 1958



Johnson

POWER PRESSES

JOHNSON MACHINE & PRESS CORP.
620 WEST INDIANA AVENUE, ELKHART, INDIANA

For more data circle 465 on Postpaid Card

new shop equipment . . .

The No. 680-6 has a maximum piece capacity of 5 inches high, 5½ inches wide, any length. Size of the machine's conveyor belt is 7 inches wide by 268 inches long.

The Model No. 680-6 has been designed for both wet and dry belt grinding. The machine's self-contain-

Viking

• THE ORIGINAL
COMPOUND SHEAR



CUTTING PRESSURE
20 times the applied pressure

VIKING SHEAR COMPANY
1018 W. 20th ST. • ERIE, PA.

Cuts straight, angle or circle in copper, brass, tin up to 12 gauge steel, etc. Special steel blades ground and tempered, adjustable and replaceable.

For more data circle 466 on Postpaid Card

RIVETERS...

GRANT

PIONEERS
and
PACEMAKERS
in their
line



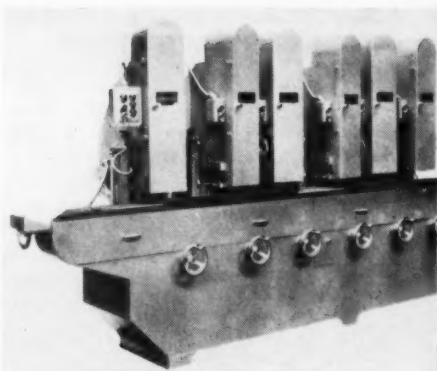

—head rivets from smallest to ¾" diameter cold steel, either by NOISELESS SPINNING or VIBRATING HAMMER method — fast, economically — types include Vertical and Horizontal Spindles, foot-power or automatic.

Free estimates of your work.
Write for catalog today.

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

For more data circle 467 on Postpaid Card

208 modern machine shop



Engelberg Conveyor Type Belt Grinder

ed cooling system is powered by two ½ h.p. coolant pumps. Abrasive belt size is 6 by 80 inches, and abrasive belt speed is 5,500 s.f.p.m. Grinding heads are powered with 7½ horsepower drive units.

For more data circle 105 on Postpaid Card


★ modern machine shop ★

DIAL INDEX FEED DESIGNED FOR PRESSES

A dial index feed, introduced by Benchmaster Manufacturing Co., 1835 West Rosecrans Ave., Gardena, Calif., features a completely different indexing motion at press speeds as high as 280 s.p.m., as well as increased shut

MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels



Ask for Descriptive Circular
MUMMERT-DIXON CO.
120 Philadelphia St. • Hanover, Pa.

For more data circle 468 on Postpaid Card

June, 1958

height on the press. The feed is equipped with a choice of 12 or 15 inch table diameters and has provisions for either 10 or 12 stations. Models with additional stations are made on special order.

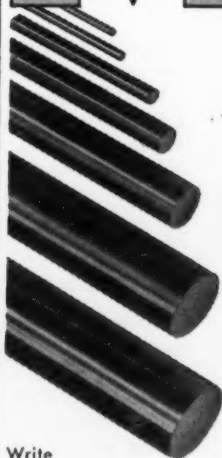
Total table height has been reduced to 2 $\frac{3}{8}$ inches. On the Benchmaster 5 ton press, shown in the illustration, this now makes a total shut height available of 4 $\frac{1}{2}$ inches (ram down, adjustment up). The dial index is made so that it can be adapted to virtually any press and can be mounted in conjunction with a Benchmaster Friction Roll Feed. The dial feed requires no extra mounting plate and it attaches directly to the press bolster area.

Positive and extremely accurate indexing is accomplished with a 6 $\frac{1}{2}$ inch diameter indexing gear, vee notched in its periphery. Notches are engaged by a rounded section spring-loaded pawl, operating on a rocker. The round shaped pawl automatically takes up for wear and instantly removes all play, insuring a highly accurate repeat on the indexing motion. All steel working parts are heat treated for long

life and freedom from wear. The table and linkage pivot pin are ball bearing mounted.

With 12 stations, the table comes to a complete dwell during a 220 degree rotation of the press crankshaft, allowing ample time for punch engagement and withdrawal before cycling to the next station.

Two stationary supports are provided in the base under the table on each side of die area. A machined boss



Write
for Name of Nearest Dealer

MARSHALL STEEL
Company

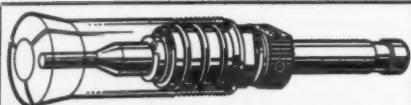
BOX 108-M, LAGRANGE, ILL.

The Aristocrat Line
of
MARSHALL
GROUND FLAT STOCK
Oilcrat
AIRcrat
MarshallCrat
OVER 2000 SIZES
ALSO
OIL HARDENING (SAE 01)
WATER HARDENING
(COMMERCIAL)
DRILL ROD
DOWEL PINS



Write for Catalog

For more data circle 469 on Postpaid Card



NEW! Self-Centering 5C Collet Stop

Quick friction adjustment. Stays in fixed position. Will not distort collet. Will not move back. Also available for other collets and spindles. 30 Days Free Trial. Several Territories Open for Distributors.

Write for Bulletin.

BYCO INDUSTRIES

2200 Smelling Ave. Minneapolis 4, Minn.

For more data circle 470 on Postpaid Card

CAMS

MADE TO YOUR SPECIFICATIONS

—Except Screw Machine Cams—

Design Assistance Offered

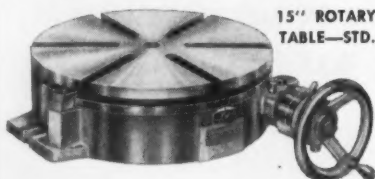
KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 471 on Postpaid Card

The STEVENS Line SINCE 1925

Introducing NEW series



15" ROTARY TABLE—STD.

ROTARY TABLES, 5-7½-8-12-15-18-24" sizes both standard and dial indexing types
ADJUSTABLE TILTING TABLES, #0-1-2
COMPOUND TABLES, #1-2
ROTARY-COMPOUND TABLES, #1-1½-2
INDEX CENTERS—multiple spindle
SPECIAL MACHINES—designed and built.

See your dealer or write for bulletins

The John B. Stevens Company

Main Street, Somersville, Conn., U. S. A.

For more data circle 472 on Postpaid Card

210 modern machine shop

new shop equipment . . .



Dial Index Feed on Benchmaster Press

between these provides mounting area for additional support or for tooling. For a further increase in production a drop-off, provided for in the mounting base, can be used.

For more data circle 106 on Postpaid Card

★ modern machine shop ★

RECIRCULATING FURNACES

A standard line of 200 degree F. recirculating furnaces has been announced by Grieve-Hendry Co., Inc., 1401 West Carroll Ave., Chicago 7, Ill. These units were designed specifically for solution heat treating and similar processes. With potentiometer type temperature controllers they meet Mil Specs. Standard models are available for either electric or gas heat. Oil fired units are supplied on special order, as are the 1,250 degree F. units.

June, 1958

Grie

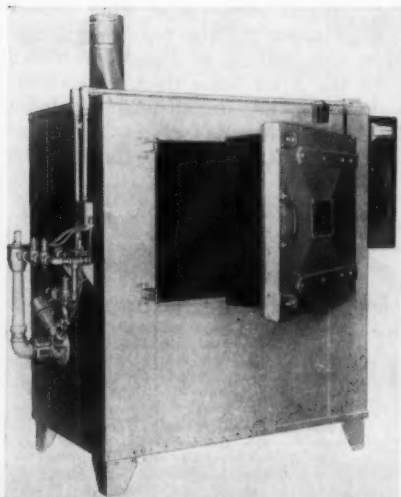
Jun

The model shown in the accompanying illustration is a Gas-Fired Model HX-1200 Furnace. Work chamber dimensions are 38 inches wide by 20 inches deep by 26 inches high. Overall dimensions are 56 inches wide by 32 inches deep by 63 inches high. A 150,000 B.T.U. gas burner is installed in the furnace. The recirculating air blower is driven by means of a $\frac{3}{4}$ h.p. motor.

Standard units are available in sizes both larger and smaller than the one shown. The company states that all models feature high pressure, high velocity air circulation, moving in a rapid definite pattern through the work space. To insure maximum temperature uniformity, the air flow is accurately controlled by means of adjustable type louvres covering the entire area of the supply and return duct work.

All models of furnaces have stainless steel interior cabinets, high temperature block insulation and stainless steel blowers for the high temperature operation.

For more data circle 107 on Postpaid Card



Grieve-Hendry Model HX-1200 Furnace

June, 1958

AIRETOOL HEAVY DUTY SMALL WHEEL GRINDER

pneumatically
operated . . .

For easy, accurate grinding on dies, molds, patterns, castings or any metal parts. Lightweight . . . easy to hold . . . no vibration. Precision-made ball bearing 3-blade rotary motor assures long life . . . low maintenance.

MODEL 400-G

19,000 rpm
Length 6 $\frac{1}{2}$ "
Dia. 1 $\frac{1}{2}$ "
Wt. 1 $\frac{1}{2}$ lbs.
 $\frac{1}{4}$ " Collet Chuck or
3 $\frac{1}{8}$ "-24 Spindle
1 $\frac{1}{2}$ " or 2" Wheel
Operating Pressure:
90-100 psi

Designed and produced by
pioneers in pneumatic
motor
equipment

AIRETOOL

MANUFACTURING COMPANY

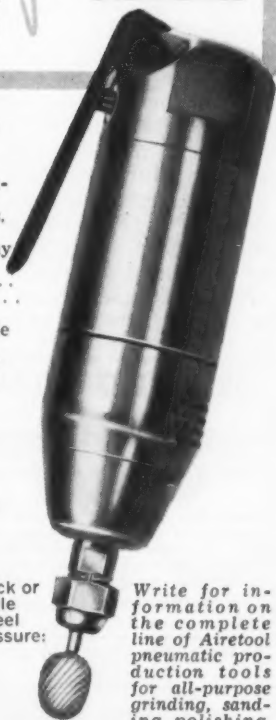
SPRINGFIELD, OHIO

CANADIAN PLANT:
Brantford, Ontario
EUROPEAN PLANT:
Vlaardingen,
The Netherlands

Airetool offices and representatives in principal cities of U.S.A., Canada, Mexico, Puerto Rico, South America, Hawaii, England, Italy, Europe, Japan.

For more data circle 473 on Postpaid Card

modern machine shop 211



Write for information on the complete line of Airetool pneumatic production tools for all-purpose grinding, sanding, polishing, die grinding and drilling.

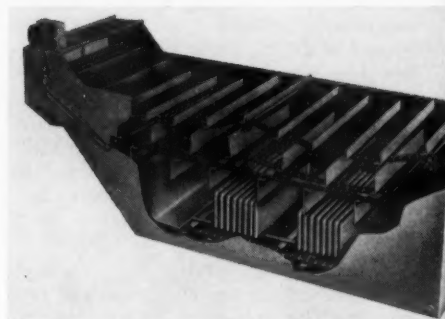


new shop equipment . . .

FILTER FEATURES MORE SURFACE AREA AND REMOVAL OF FOAM BORNE SOLIDS

Greater filter surface area is provided by in the Delpark Dual Manifold Filter by the use of leaf type design filter elements, according to Industrial Filtration Co., Dept. CF-294, 13 Industrial Ave., Lebanon, Ind. The leaf type filter element offers an advantage in the increased area and because of the flexibility of the filter media. The filter may vary through the entire range of natural, synthetic and metallic fibers, depending upon service requirements. The filter media is supported from the inside by chain link mesh arranged to prevent collapse.

As the elements are backwashed for cleaning, the give or pulsing action



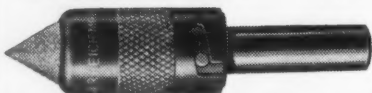
Delpark Self-Cleaning Dual Manifold Filter

flexes sufficiently to loosen adhering particles and the cleaning action is more easily accomplished.

The dual manifold principle permits a reduced filter unit size with automatic self cleaning, opposite cycling of the manifolds. While one manifold filters, the other is being backwashed for cleaning.

The unit illustrated shows an additional set of skimmer flights for removal of foam created by extremely fine particle suspension. One set of chain driven flights removes sludge from the bottom of the tank blown from the filter leaves during cleaning, and the smaller flights push the foam borne contaminants to the ramp where they are then carried away by the chain driven flights from the bottom.

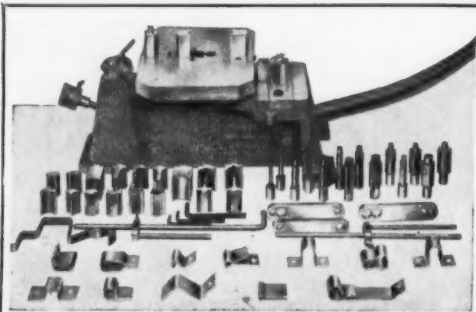
ABRASIVE CENT-R-LAP TOOL



Saves time, eliminates diamond dressing. Cones changed in seconds. Available in three sizes: $\frac{3}{8}$ " , $\frac{3}{4}$ " and $1\frac{1}{2}$ ". Cent-R-Laps and abrasive cones in leading grits. Write for descriptive literature and prices. Sold to consumers only.

J. R. REICH MANUFACTURING CO.
201 E. Stroop Rd. Dayton 29, Ohio

For more data circle 474 on Postpaid Card



Multiform **BENDER CUTTER**

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, and Steel Rule Dies for Metal Blanking.

AIR OR HAND MODELS FOR UP TO $\frac{1}{4}$ " to 4" MATERIAL

Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.
Dept. 6-M Kalamazoo, Mich.

For more data circle 475 on Postpaid Card

This particular unit is ideally suited for the filtration of water from wet type dust collectors and other liquids with high solids content.

Units are available in flow capacities from 5 to 1,000 g.p.m. on water. Higher capacity flows are handled by using multiple units.

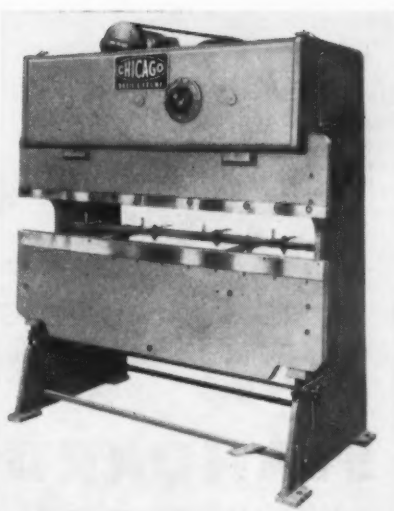
For more data circle 108 on Postpaid Card

★ modern machine shop ★

25 TON CAPACITY PRESS BRAKE

Dreis and Krump Manufacturing Co., 7418 South Loomis Boulevard, Chicago 36, Ill., has announced a 25 ton capacity Chicago Press Brake for bending and forming sheet metal. The machine will bend 60 inches of 14 gauge or 72 inches of 16 gauge mild steel.

An all steel welded frame and deep-section bed and ram of rolled steel plate assure permanent alignment and minimum deflection under load. A variable speed drive through a disc type friction clutch, that can be jogged or



Chicago 25 Ton Capacity Press Brake

slipped, gives a choice of speeds from 20 to 50 strokes per minute. The disc type brake stops the ram as soon as the clutch is released.

For more data circle 109 on Postpaid Card

GRIND: RADIUS—ANGLES

QUICKLY—on your SURFACE GRINDER—EASILY

RADIUS DRESSER \$44.00

Diamond \$8.00

ANGLE DRESSER \$49.00

Diamond \$8.00



ORDER DIRECT
on our 10 day
money back
guarantee



Chatter Resistant, Spring Loaded Spindle

Hardened shaft—bearing adjustable for wear.

Diamond always perfectly centered.

Easily set adjustable 180° stops.

All surfaces ground true from hole.

CAPACITY—1½" convex to 4" concave.

10" Wheel size for DoALL and NORTON Grinders—\$49.00. Diamond \$8.00.

14" 20" 24" in stock, low price.

Ball Thrust Bearing—

24 Precision Ground Surfaces.—DIAMOND BLOCK Slides In Ground & Lapped Housing, Can't Chatter.—Set Accurately With Protractor or Sine Bar to 1" of Arc. Largest Bearing Surfaces of Any Angle Dresser.

The "Mighty Midget" Line

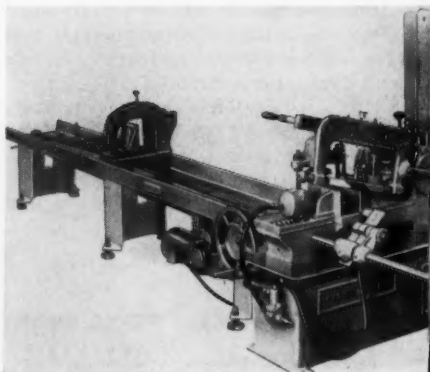
SPIRMAN METAL SPECIALTIES • 2192 E. 21st ST. • BROOKLYN 29, N. Y.

For more data circle 476 on Postpaid Card

new shop equipment . . .

UTILITY AUTOMATIC METAL CUTTING MACHINE

Greater range for cutting of ferrous and non-ferrous metals in job shops or production plants is provided in the Utility Automatic Stock Feed Metal Cutting Machine which Racine Hy-




Racine Utility Automatic Cutting Machine

draulics and Machinery, Inc., 2070 Albert St., Racine, Wis., is offering in two or four speed models.

Models 66W2A and 66W4A also have stepped up cycling time, giving 1 inch pushup per second, conducive to greater production at lower cost and with undiminished quality. Accuracies to 0.005 inch are said to be assured by a microswitch control.

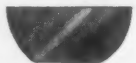
The Utility Automatic has been designed for auxiliary service, for short run work, to handle overloads or to round out the user's present line of metal cutting equipment. It will cut cold rolled steels, cast iron, high speed steels and hard alloys, as well as titanium alloys. Speed changes are made easily. A fast operating auto-



MARK OF QUALITY

STANDARD

WOODRUFF KEYS



We manufacture a complete line of Woodruff keys in all standard sizes. These sizes range from as small as $\frac{1}{2}$ " x $\frac{1}{16}$ " to keys as large as $3\frac{1}{2}$ " x $\frac{3}{4}$ ". All keys are carefully checked for burrs, slivers, etc., before being shipped to you. Only the finished tested keys are permitted to leave our plants.

We carry a complete stock of high quality, dependable keys. Send for our catalog for complete information on Woodruff keys, taper pins, machine keys, and machine racks.

STANDARD STEEL SPECIALTY CO.
 BEAVER FALLS • PENNSYLVANIA
 Plants: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 477 on Postpaid Card



SPELLMACO "SPOTTERS"

A matched set of transfer punches for toolmakers, machinists and tool cribs

Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes $\frac{3}{32}$ " to $\frac{1}{2}$ ", by $\frac{1}{64}$ "—plus handy $\frac{17}{32}$ " size. Length $4\frac{3}{4}$ ". ONLY \$17.90.
Single sizes available

R. L. SPELLMAN CO. • URBANA, OHIO

For more data circle 478 on Postpaid Card

matic air vise plays an important part in this production setup.

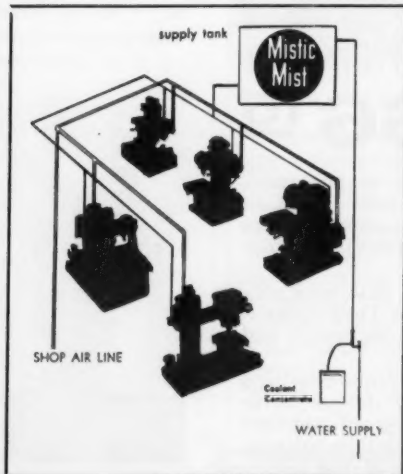
For more data circle 110 on Postpaid Card

★ modern machine shop ★

CENTRALIZED MIST COOLANT SYSTEMS

Using the principle of gravity feed, the Mistic Mist Centralized Cooling Systems manufactured by Aetna Manufacturing Co., 174 South York St., Bensenville, Ill., supply premixed coolant to any number of machines from a single supply source. The injector valve on the water supply line permits supply tank refill from floor level. The ratio of the mixture is governed by the size of the supply tank and the amount of concentrate dilution.

Individual control valves are mounted on each machine, convenient to the operator for immediate and precise control of air and coolant mixture. The Centralized Coolant Systems provide for future system expansion.



Aetna Centralized Mist Coolant System



ENCO Self-Indexing HEXTURRET

Convert your lathes for turret work this quick, easy way. ENCO HEX-TURRET gives you the accuracy, rigidity and speed you need to step up lathe production and cut "per piece" costs. Easy as mounting your lathe tailstock. Does both normal and heavy lathe and screw machine work, drilling, counter boring, counter sinking, spot facing, reaming, turning, boring, etc. Fit all lathes 9" to 16" swing.

Mail coupon for cat. #53 and name of nearest Enco Franchise Dealer.

ENCO Mfg. Co.
4520 W. Fullerton
Chicago 39

ENCO Manufacturing Co.
4520 W. Fullerton,
Chicago 39. Dept. 168



Please send catalog #53 and full details of ENCO HEXTURRETS.

Name

Firm

Address

For more data circle 479 on Postpaid Card

modern machine shop 215

new shop equipment . . .

They eliminate the need for manual refill of individual machine sump tanks or coolant tanks.

Mistic Mist control valves can be used singly or in banks, for manual or automatic control, with an unlimited number of outlets. A selection of nozzle leads is available; steel mesh

covered, plastic or copper tubing and flexible cable. There are variations in nozzle holders available to cope with any application requirement.

For more data circle 111 on Postpaid Card

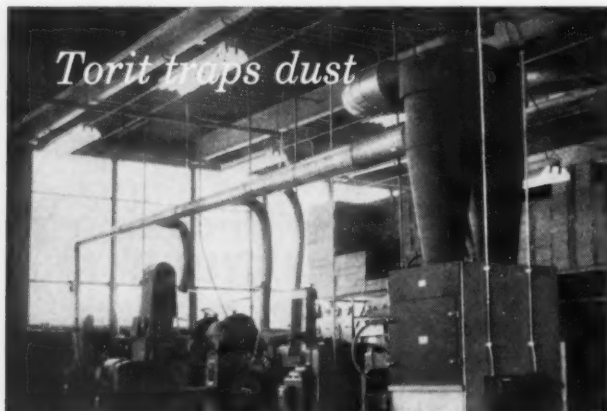
★ modern machine shop ★

COLOR FILLING AND PRINTING MACHINE

An air powered printing machine that applies color

to depressed or sunken cavity letters and design—also applies color to raised panels, faces of raised letters and design, or combinations of both — has been announced by The Acromark Co., 9 Morrell St., Elizabeth, New Jersey.

This machine has been designated as the Acropainter Model 401-A and it consists of a cast iron



Six machines protected from dust by Torit for \$666¹⁵

This Torit Dust Collector, Model 219FM, complete with accessories, was installed by the Mohr Lino Saw Co., Skokie, Ill., to protect 3 belt sanders and 3 other grinders (2 grinders hidden from view) from destructive dust—at a total cost of just \$666.15!

After one year's operation, Mohr Lino Saw says this about their *low-cost* Torit installation: "The Torit installation has kept our shop *cleaner*, our operators *happy*, and *protected vital machinery*."

You too can achieve greater machine protection and cleaner working conditions by trapping dangerous or valuable dust at its source with a completely *self contained* and *portable* Torit Dust Collector. For full details write to:

TORIT MANUFACTURING CO.

Dept. 703, 311 Walnut Street, St. Paul 2, Minn.

For more data circle 480 on Postpaid Card



Model 401-A
Acropainter

base with a platten type printing machine mounted at average operator feeding height of 32 inches.

A gear and rack arrangement powered by an air cylinder, which is mounted in the back, provides the operating power to apply printing pressure to any product that is properly positioned; usually on a positioning fixture. An imprint of ink or enamel in any desired color is thus applied and by specially mounting the Acroprene die, the ink can be applied even to cavities and to deep depressions.

Excellent for coating the faces of raised lettering and design, this Acroprinter, with its automatic impression controls, supplants air polluting sprays, silk screen and other less accurate methods by providing the skill factor. With proper Acroprene dies and simple adjustment, anyone can operate at speeds determined by operation feeding ability, size and complexity of the application.

The Acroprinter comes in three sizes for marking items ranging from tabs or buttons up to adding machine housings and similar formed or molded parts.

For more data circle 112 on Postpaid Card

REFRIGERATION ADDS EFFICIENCY TO METALWORKING

A cooling system for all machining, tapping, drilling, grinding and metal drawing has been introduced by the Precise Products Corp., 3745 Blue River Rd., Racine, Wisconsin.

This cooling method, called Vapor-Lub, reduces temperatures of the entire work area by refrigeration and minimizes cutting tool frictional heat with a special lubricating concentrate

PALMGREN

**GET THIS
FREE
CATALOG on
Work Holding
Tools now!**



Used in all industries . . . everywhere

This catalog shows the most complete line of work holding tools available anywhere for production on milling machines and drill presses . . . angle vises . . . drill press vises . . . swivel machine vises . . . adjustable angle plates with or without swivel bases . . . production vises . . . heavy duty angle vises . . . rotary and indexing tables for use on milling machines and drill presses . . . milling attachments for milling on lathes.

There are 68 different models and types of Palmgren vises, rotary tables, milling attachments and other machine tool accessories, with jaw sizes from 1½" to 8". Ask for your copy of this FREE Catalog No. 205 today, showing the complete line, details and prices.

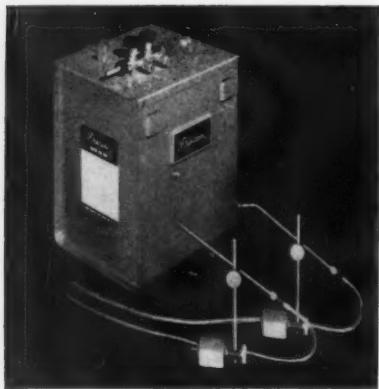
125

CHICAGO TOOL and ENGINEERING CO.

8399 SOUTH CHICAGO AVE. • CHICAGO 17, ILLINOIS

For more data circle 481 on Postpaid Card

new shop equipment . . .



Precise Products Vapor-Lub Cooling System

which is atomized under pressure and which is deposited on both the tool and the working surface. The refrigerat-

ing operation, which is accomplished by the sudden expansion of compressed air through a precision nozzle, absorbs heat from the surrounding work area and reduces temperature of the cutting surface up to 20 degrees below ambient. A jet type nozzle permits accurate positioning of the lubricating and refrigerating stream for maximum efficiency.

The entire Vapor-Lub cooling system is portable and can be easily transferred from machine to machine without special handling equipment. It can be installed in minutes and is said to require no plumbing or coolant pans.

For more data circle 113 on Postpaid Card

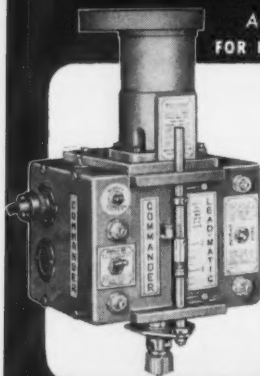
★ modern machine shop ★

OPTICAL DEVICE

TBW Products, 633 South Isis Ave., Inglewood 1, Calif., is now marketing

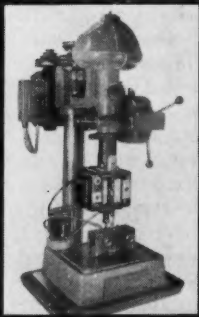
Commander LEAD-MATIC Tapper

Automatic Tapper with Lead Screw
FOR HIGH PRODUCTION PRECISION TAPPING



- Precision Ground Lead Screws Assure Finest Threads
- Electrically Controlled Cycle or Jog Tapping Action
- Hand, Foot or Fixture Switch Control
- Easily Adapted to Any Drill Press
- Range #0 to 3/4"

Built for high production tapping . . . precision or otherwise, the Commander Lead-Matic Tapper makes any drill press a precision tapping unit, even with inexperienced operators. Electric control of Cycle or Jog tapping action provides versatility to handle any job . . . automatic tap reversal eliminates drill press motor reversing and speeds tapping. Compact, ruggedly built, easy to operate, the Commander Lead-Matic Tapper will cut your tapping costs and reduce rejects to a minimum.

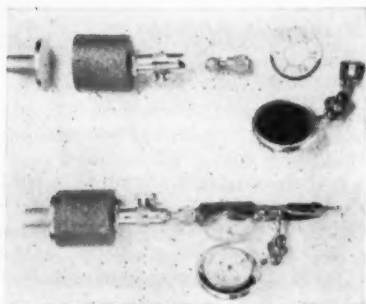


Write for illustrated circular and name of nearest Distributor.

Commander MFG. CO.

4224 W. KINZIE ST. • CHICAGO
PRODUCT OF COMMANDER . . . BUILDER OF PRODUCTION TOOLS

For more data circle 482 on Postpaid Card



The MiraClip Optical Instrument

MiraClip Products which have been designed to enable precision machine operators to quickly, accurately and safely read dial indicators in cumbersome and awkward positions and, at the same time, leave both hands free to allow for moving the table in either direction.

Features of the MiraClip include the following: device consists of a mir-

ror, clip, reverse dial adaptor, magnetic body and height gage attachment. Components are produced in a wide variety of sizes and styles, so that adaptations can be readily made to fit practically any standard type gage or indicator.

For more data circle 114 on Postpaid Card

★ modern machine shop ★

DOUBLE CRANK O.B.I. PUNCH PRESS

A 40 Ton Double Crank, Open Back Inclined Rousselle No. 4B Punch Press, featuring extra large die area and an entirely new electrically controlled air operated friction clutch, has been announced by Service Machine Co., 2310 West 78th St., Chicago 20, Illinois.

The Rousselle No. 4B has a double crank design, whereas the ram is not



BASIC PRICE . . \$395.00

**SCHERR PRECISION
COMPARATOR CHARTS**

**OVERLAY and REPLACEMENT
STANDARD CHARTS**
are carried in stock.

SPECIAL CHARTS made up
to your specifications.

INSPECTION BY PROJECTION

with the **NEW SCHERR**
MICRO PROJECTOR
with the **VERTICAL DESIGN**

**NEW IMPROVED
Self-Contained MODEL**

featuring

Rigid Floor Base — eliminating extra charge for table
Tilting Stage for Helix, Angles and Bevels
4" Dia. Stage Opening
14" Diameter Screen
Column Slide adjustable for wear by means of gibs. Will hold square indefinitely.

Custom made Precision Coated Lenses and double condensers for different objectives 10 to 100X magnification.

Surface Illuminator can be added anytime.

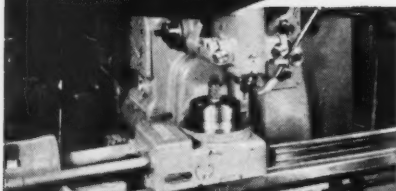
An entirely new practical designed tool for Inspection Department and Production Shop.

WRITE FOR ILLUSTRATED FOLDER — CODE GIJY

GEO. SCHERR CO., Inc. 200-MM LAFAYETTE ST. • NEW YORK 12, N.Y.

For more data circle 483 on Postpaid Card

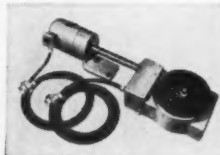
How To Increase Production And Improve Accuracy



With a **SUNDSTRAND** Automatic Index Base

In many cases, the addition of this Automatic Index Base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this service.

**Accurate
Spacing,
Powerful
Clamping
Insures
Accuracy**



Sundstrand
Automatic Index Base

This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

Get Complete Data Free

This 8 page booklet contains production figures and specifications. Send for your copy today. Ask for bulletin 592.



SUNDSTRAND MACHINE TOOL CO.
2539 Eleventh Street, Rockford, Ill., U.S.A.

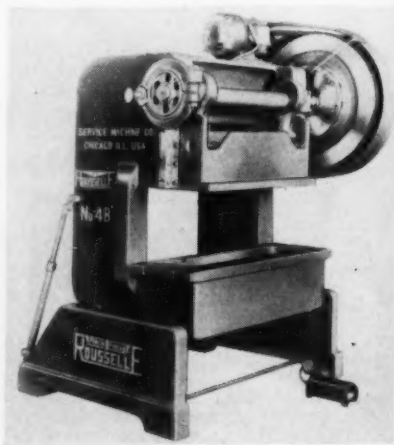
For more data circle 484 on Postpaid Card
220 modern machine shop

new shop equipment . . .

only guided by the ways, but by the crankshaft itself, assuring accurate operation even under unbalanced loads. The bed area is 16 by 48 inches, face of ram 14 by 36 inches, along with a die space of 12 inches and a clearance between the housings of 36 inches, making this press adaptable for multiple punching, large workpieces and multiple and regulator operations.

Mechanical features include long ram ways, bronze main and crank bearings and roller bearing flywheel. The electrically controlled air operated multiple plate friction clutch and air releasing brake operate with extremely low air consumption. This is accomplished by a short piston stroke and closely machined air chambers.

The electric control features plug-in controls for foot or two hand operation, and can be changed from single to continuous stroke, immediately with a selector switch. A jog button is also furnished as an aid for setting dies. For more data circle 115 on Postpaid Card



Rousselle No. 4B O.B.I. Punch Press

RAC

TH

MM

has

78

chine

TH

chine

notch

nomi

de

either

right

head

the r

left f

Th

ly v

where

proce

Th

table

inche

of lon

clamp

Wh

teeth

autom

traver

Donau

June,

June, 1958

RACK MILLING MACHINE

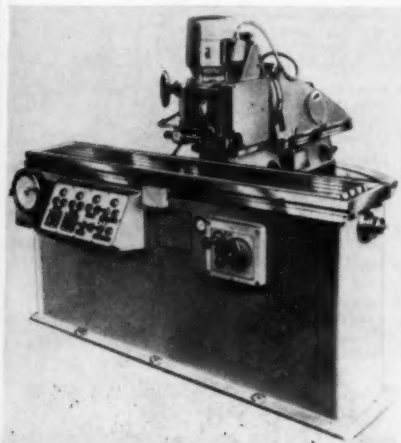
The Index Industrial Corp., 150-MM Broadway, New York 38, N. Y., has announced that the Donau 14 by 78 inch table size rack milling machine is now available.

The Donau Racking Milling Machine enables the milling of racks and notched bars, and makes possible economical indexing operations. The saddle can be swivelled 30 degrees in either direction to permit cutting of right and left hand teeth. The milling head can be swivelled 10 degrees to the right and up to 90 degrees to the left for relief milling.

The milling saddle feed is steplessly variable by hydraulic control, whereas the rapid traverse motion proceeds at a constant speed rate.

The large work locating area of the table permits a working length of 71 inches to be milled in one cycle. Racks of longer lengths can be milled by re-clamping.

When a predetermined number of teeth have been cut, the table returns automatically by means of the rapid traverse and the machine stops.



Donau Rack Miller has 14 by 78 inch table

CLIP and MAIL

WE NEED LIGHTS

send me ☐

(FILL IN)

VIMCO *Lights*
of this model



Vimcolights are



\$4³⁵

(price includes postage)

**REPLACE WORN
MACHINE LIGHTS NOW**

**HERE IS THE LIGHT
THAT MADE VIMCO FAMOUS**

Side Mounting Type

No. A-15-7-50. This model consists of an "L" shaped, heavy gauge steel bracket for side mounting. With an 18" heavy duty flexible arm that withstands vibration. The cone shaped reflector is 3" in diameter, heat resistant and ruggedly designed for mill or vibration service. Socket is the push thru standard size.

**VIMCO LIGHTS
ARE INSTANTLY ADJUSTABLE**

Six standard models with or without extension tubes, straight or angle sockets and a variety of base fittings are available. Write today for your free folder showing the complete line.

VIMCO MFG. CO., INC.

Since 1919

109 Brayton St., Buffalo 13, N.Y.

Check one

TERMS: On approved credit or cash with order. 1/10-N/30

Please bill me ☐
Send COD ☐
My check enclosed ☐

For more data circle 485 on Postpaid Card

modern machine shop 221

new shop equipment . . .

Variable hydraulically operated saddle motion insures long cutter life and permits quick resetting of feeds.

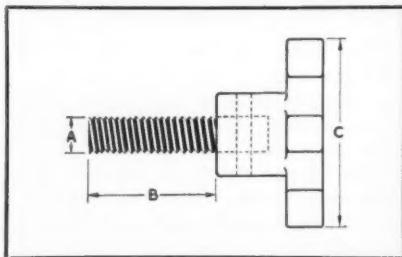
An electrically controlled pendulum device enables work up to 31½ inches in length to be milled on two fixtures. When the operation on Fixture 1 is terminated, the table automatically skips to Fixture 2.

For more data circle 116 on Postpaid Card

★ modern machine shop ★

HAND KNOB ASSEMBLIES

Reid Tool Supply Co., Muskegon Heights, Mich., is now marketing complete hand knob assemblies, consisting of smooth cast iron knob with threaded steel stud. The stud is assembled to the knob with a light press fit and is



Drawing shows Reid Hand Knob Assembly

held in place with a roll pin. These assemblies have a black oxide finish. They are suitable for many clamping operations, especially in the construction of jigs, fixtures and other special tooling.

These Reid Hand Knob Assemblies are available in ten sizes. In addition, specials can be made to order by the company.

For more data circle 117 on Postpaid Card

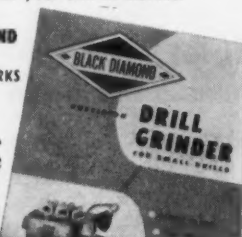
Cut Drill Costs!

Eliminate expensive "outside" sharpening . . . or time-costly "hand-sharpening"! BLACK DIAMOND (up to ¾" Drills) or WORCESTER (up to 2½" Drills) DRILL GRINDERS are always set up to sharpen 1 or 100 drills . . . change sizes in seconds. Your most inexperienced man (or woman) can easily restore like-new sharpness to dull drills in ten seconds, and pay for your unit in months!

BLACK DIAMOND

SAW & MACH. WORKS
71 North Avenue
Natick, Mass.

Get this
Folder ➔



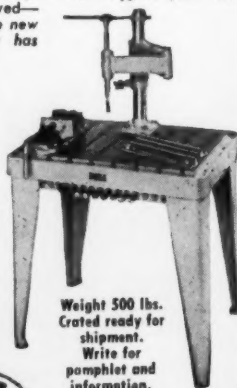
For more data circle 486 on Postpaid Card

222 modern machine shop

Try this Allman Universal Hand Tapper FREE for 15 days—

Results have proved that once this tapper is in your shop or tool-room and you find 70% of your free hand tapping time saved—it will stay there! The new Allman hand tapper has these advantages:

- Articulate arm swings clear of large table for placement of work.
- Limitless number of sizes of tapped holes without moving work piece.
- Vise holds work as small as ¼" square.
- Floating tap locates itself in hole.
- Individual spindle holds taps, thus change requires only seconds.



TOOLS, INC.

1734 No. 25th Ave. • Melrose Park, Ill.

For more data circle 487 on Postpaid Card 8

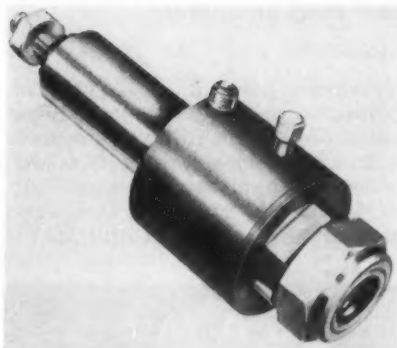
June, 1958

DEEP HOLE DRILLING TOOLS FOR MULTIPLE SPINDLE MACHINES

Boyar-Schultz Corp., 2020 South 25th Ave., Dept. T-D, Broadview, Ill., has announced deep hole drilling tools which have been designed and developed for use on multiple spindle automatic screw machines. They are available in four different models to fit all types of multiple spindle automatics.

In drilling, heat, long stringy chips and drill breakage are all factors with which to be reckoned. The oscillating action of the deep hole drilling tool breaks the chips into fine granules, eliminating the chip problem and affording long drill life through cooler running. In addition, fine finishes, close tolerances and better concentricity are maintained.

The oscillating motion is derived from a flutter or wave cam built into the tool. It oscillates 0.006 inch three times per revolution of the drill. The



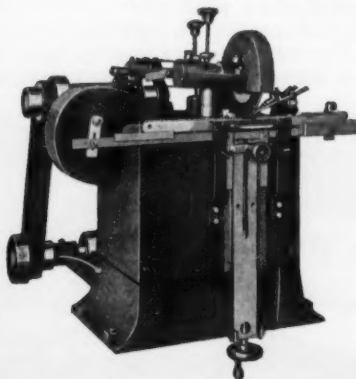
Boyar-Schultz Deep Hole Drilling Tool

tool is driven by the drill speeder spline shaft.

In order to cut freely, a drill must run at the highest surface feet possible without burning the drill. If the spindle speed of the job is not high enough, the revolving type tool is used

DON'T THROW YOUR SAWS AWAY *Resharpen Them Like New*

HACK, BAND OR CIRCULAR



WARDWELL "EC" COMBINATION GRINDER will sharpen a gross of Hack Saw Blades at least 6 times, thus saving the price of the machine.

Sharpens Band and Circular Saws too. The EC Grinder does not depend on shape of grinding wheel to form shape of teeth.

Write for Bulletin EC



WARDWELL

3803 Ridge Road
Cleveland 9, Ohio

MAKER OF LARGEST LINE OF SAW AND TOOL SHARPENING MACHINES

For more data circle 488 on Postpaid Card

new shop equipment . . .

to increase the surface feet. By revolving the drill in the opposite direction of the spindle, it becomes possible to attain proper surface feet, as well as definite improvement in concentricity. It will also afford fast cycle time, in addition to prolonged drill life.

CAMS

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC.

23-16 44th Road Long Island City 1, N. Y.

For more data circle 489 on Postpaid Card

WALLS TU-WAY BELT SANDER

USE IT
EITHER WAY

Full
1/3 h.p.
G. E. Motor



HORIZONTAL

VERTICAL

At last, a top quality industrial sander that provides all the most wanted features - yet sells for so little. **\$89.95** complete with cord, plug, switch ready to use

Illustrated Literature on Request
A few desirable distributor territories still available.

WALLS SALES CORPORATION

333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 490 on Postpaid Card

224 modern machine shop

Variations in drill speed are obtained by utilizing the various gear ratios available in the drill speeder drive of the machine. Standard, fast spiral drills are recommended.

For more data circle 118 on Postpaid Card

★ modern machine shop ★

CUT-DOWN SAW

New speed, precision and versatility in miter and compound angle cutting are said to be available in the 58 Cut-Down Machine, developed by Irvington Machine Works, 1808 Northeast Seventh Ave., Portland 12, Oregon.

Using a 12 inch saw blade or abrasive wheel, the machine produces smooth cuts and perfect angles for the accurate joining of metal parts.

Built for 90 degree cut-off and miter cutting, the Irvington 58 is also available with an accessory compound angle unit that permits cutting accurate compound angles. Also available is an accessory hand crank and worm gear assembly for precise setting of the machine to accurate compound angles. An accessory for clamping the work to the fence insures precisely accurate cuts all the way through the material.

The Irvington 58 can be equipped with either a fixed or movable guard, depending upon the material to be cut.

The large, surface ground table has accurately milled fence slots to insure

READ TEMPERATURES
ACCURATELY
with



PYRO

SURFACE PYROMETER

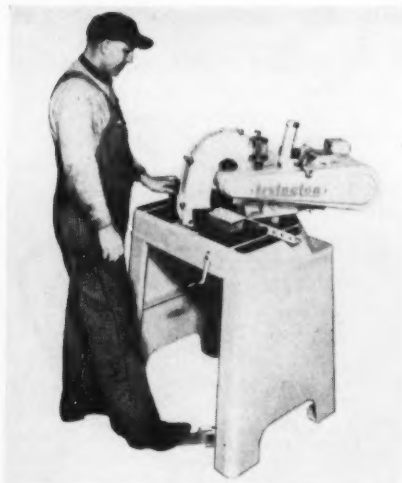
Send for FREE catalog No. 168.

PYROMETER INSTRUMENT CO., INC.

Bergenfield 42, New Jersey

For more data circle 491 on Postpaid Card

June, 1958



Irvington 58 Cut-Down Sawing Machine

cutting to a perfect square, even when the fences have been removed and replaced. Four tee slots are provided for holding jigs and for other special cutting requirements.

A special "toothed" belt drive provides non-slip operation with full power delivered to the blade at all times. A possible arbor speed variation from 1,000 to 4,800 r.p.m. extends the use of the machine to include cutting extruded aluminum and magnesium, ferrous and non-ferrous metals, plastics and rubber.

For more data circle 119 on Postpaid Card

LEFT AND RIGHT HANDED CONTOUR WHEEL DRESSERS FOR LARGE VERTICAL GRINDERS

Model 93 and Model 95 Hydraulic Contour Wheel Dressers are available for left and right handed installations on cylindrical grinders, according to Høglund Engineering and Manufacturing Co., 367 Snyder Ave., Berkeley Heights, N. J. They have been designed primarily for multiple wheel

STUDY....
these outstanding
features of the
New CHESTERMAN
Vernier
Height Gage

EASY READING
2-1/2" LONG VERNIER

RAPID QUICK
ADJUSTMENT

Sizes Available
12" - 18" - 24"
40" - 48"

Ask for and
Compare our
Moderate
Prices!

The Most
significant advance
in a quarter
Century of
HEIGHT GAGE
DESIGN

TOP VIEW

TRIANGULAR
SCALE BEAM
for Superior
Strength and
Rigidity, preventing
sway and vibration.

FINE ADJUSTMENT
THRU SCREW ON BASE

LARGE
SOLID BASE

If not available at your favorite Supply House —
Write to us for 6-Page ILLUSTRATED FOLDER—Code GIPDU

GEORGE SCHERR CO., Inc.
COMPLETE LINE OF PRECISION MEASURING DEVICES
200 -MM LAFAYETTE STREET • NEW YORK 12, N.Y.

For more data circle 493 on Postpaid Card



DYKEM
STEEL BLUE[®]

Stops Losses

making Dies and
Templates

SPECIMEN

With DYKEM Steel Blue

Without DYKEM Steel Blue

Popular package
8-oz. can fitted
with Bakelite cap
holding soft-hair
brush for applying right
at bench; metal surface
ready for layout in a few min-
utes. The dark blue background
makes the scribed lines show up in
sharp relief, prevents metal glare.
Increases efficiency and accuracy.

Write for sample on company letterhead
THE DYKEM COMPANY
2301F North 11th St. • St. Louis 6, Mo.

For more data circle 492 on Postpaid Card

HORIZONTAL SURFACE GRINDING

Up to 24"x144"
Fine Micro Finish

BLANCHARD GRINDING

To 85" diameter and up to 20"x120"
• 24 Hour Service • Steel and Aluminum Plate, any size, shape or thickness • Weldments • Shear blades sharpened up to 12".

SAL METAL PRODUCTS CO.

120 Freeman St., Dept. MM, Brooklyn 22, N. Y.
EVergreen 9-2560

For more data circle 494 on Postpaid Card



TRUE POINT DRILL SHARPENER

for Drills 41 - 60 and
61 - 80 R.H. & L.H.

A properly sharpened drill cuts faster — more accurately and is less likely to break.

Write for circular and full details.

UP-TO-DATE TOOL CO.

P. O. Box 99, Station A, Worcester 8, Mass.

For more data circle 495 on Postpaid Card

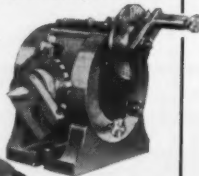
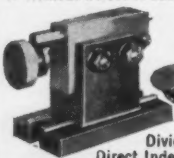
UNIVERSAL DIVIDING HEADS



• Precision built to meet every requirement, Carroll Dividing Heads are the accepted standard in metal-working plants from coast to coast. • A unique optional swivel base makes possible speedy and accurate work settings to compound angles. This and other features convert a conventional Dividing Head into a Universal Work Head or Rotary Table.

Write for 8 page catalog giving complete details, etc.

Other Models 6" With or Without Direct Indexing.



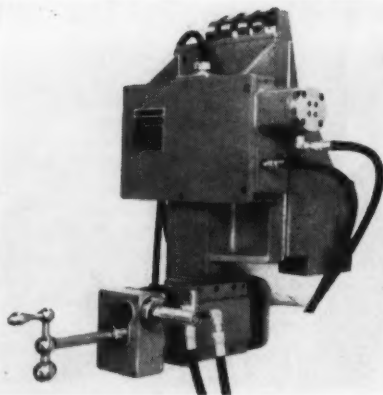
10"-12" Universal
Right or Left Hand
Dividing Heads with or without
Direct Indexing. Also with Spiral Drive.

CARROLL DIVIDING HEAD CO.

3525 Corditt Ave. • Cincinnati, Ohio

For more data circle 496 on Postpaid Card

new shop equipment . . .



Hoglund Hydraulic Contour Wheel Dresser

grinders and for grinding applications which cannot be handled by a single spindle grinder.

The units feature automatic hydraulic operation, tied in with the grinder cycle. Contours are produced by reduction of a contour template through an inclined plane mechanism. Dressing diamonds are preset in an optical fixture so that no dresser readjustment is necessary when changing diamonds. Accuracies to 0.0001 inch are possible. Models 93 and 95 are applicable to contours up to 2½ inches in width and 2 inches in depth.

For more data circle 120 on Postpaid Card

★ modern machine shop ★

SHELL TRIMMER IS ENGINEERED FOR HIGH CAPACITY AND MINIMUM TOOLING

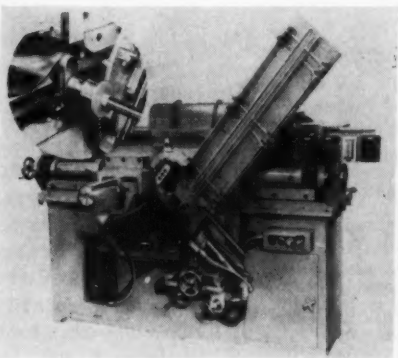
A concept of trimming drawn shells has been engineered into the Model ST-4 Sliding Knife Drawn Shell Trimmer, introduced by Dayton Rogers

Dayton
Drawn Shell
shell and

Manufacturing Co., Minneapolis 7D, Minn. Up to 800 shells per hour of any shape within a 6 inch diameter can be trimmed, excepting those with extreme internal corners.

The sliding knife feature incorporates two engineering principles which combine to give a maximum of directed trimming force. Basically the sliding knife mates with a rotating universal bolster spindle holding the shell. Maximum trimming force is achieved because (1) the rotating shell is in constant overlap, and (2) the sliding knife at point of contact travels at a lineal speed greater than that of the rotating shell. Any change in direction of force is eliminated, and a slicing action enables the trimming to be done with less unit force.

Safety features include dual start buttons; a shell checker which will not allow the trim cycle to start unless the shell is in proper seated position; an emergency return that stops all action immediately and returns components to the starting position; and a non-repeat feature that will not allow the machine to repeat the cycle before the next shell is placed on the mandrel. For more data circle 121 on Postpaid Card



Dayton Rogers Model ST-4 Sliding Knife Drawn Shell Trimmer. Inset shows the trimmed shell and the knife at the end of the slide

New CATALOG

WM. SOPKO & SONS CO.

GRINDING WHEEL ADAPTERS

AND TOOLROOM ACCESSORIES



WRITE
FOR YOUR
FREE COPY

Finest quality ADAPTERS

- Precision-made, Hardened and Ground with Heat Treated Nuts
- Complete Line—4 New Models Available
- For Use on All Popular Surface Tool and Cutter Grinders
- Large Stocks—Immediate Delivery

USE SOPKO ADAPTERS—SAVE TIME, TROUBLE AND MONEY

WM. SOPKO & SONS CO.
140 E. 267th ST. • EUCLID 32, OHIO

Please send your New Free Illustrated CATALOG

NAME

TITLE

COMPANY

STREET

CITY

STATE

For more data circle 497 on Postpaid Card
modern machine shop 227

new shop equipment . . .

SPECIAL MACHINES CREATED FROM STANDARD MACHINE COMPONENTS

Burg Tool Manufacturing Co., Inc., 15001 South Figueroa St., Gardena, Calif., builds the Standard Burgmaster Model 2BH Six Spindle and 3BH Eight Spindle Automatic Hydraulic

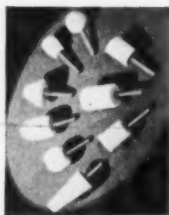
Turret Drills on a similar design and control basis. These machines carry on a series of automatic operations including drilling, boring, counterboring, countersinking, tapping, reaming and multiple forming. Spindles are automatically indexed and controlled, having their own preselected speed and feed and automatic precision depth stop. Feeds are infinitely variable and can be quickly adjusted to suit the

work at hand for long tool life and best finish. Any sequence of operations can be performed, and the machining cycle can include skip indexing or duplicate and repeat individual operations. All spindles have automatic rapid approach and return to save valuable machine operation time. As shown on the button control panel, the controls are simple and easy to set. The whole system results in a machine having maximum flexibility for carrying out a sequence of machining operations with rapid changeover from one part to another, simply by changing tools and fixtures.

These same standard turret head components

TICKLISH FINISHING JOB? do it better with a Paramount Felt Bob

If you have a tough polishing, buffing, lapping or de-burring finishing problem where tolerances must be held close, solve it by putting a Paramount Bob on the job. Seven custom shapes, 42 sizes, four degrees of hardness from soft to rock hard — there's a Paramount Bob ideal for every close-quarters precision finishing job. For example:



MICRO-FINISHING

Paramount Felt Bobs make ultra-fine finishing of surfaces quick, easy and economical.



DIE AND MOLD MAKING

Thousands of die and mold makers depend on Paramount Bobs to perform precision finishing and buffing operations. Ideal for removing burrs without destroying close tolerances.



NEW BOB ASSORTMENT KITS

K-1 Assortment includes 24 mandrel mounted bobs, 36 small wheels, touch-up pads — 66 pieces all together — packaged in one convenient bench top box. (K-2 Assortment also includes four sticks assorted polishing compounds.)

These handy assortments provide bobs of just the size, shape and hardness you want — and at \$10.95 (K-1) and \$12.95 (K-2) they are far below the cost of buying bobs separately.

See your jobber or write for literature

BACON FELT CO.

457 West Water St., Taunton, Mass.

**JOBBER INQUIRIES
INVITED**

For more data circle 498 on Postpaid Card

can be assembled in order to create special machine tools economically. The only engineering required is the machine base, holding fixtures and tools. The six or eight spindle automatic hydraulic turrets and slides can be mounted at any angle required to suit the workpiece. As shown, the machines can be mounted horizontally, at any angle, on moving columns or in any manner dictated by the work. Each unit has its own hydraulic power unit and each component can be individually controlled, or the entire machine can be controlled from a central control panel.

Holding fixtures can be designed to suit production requirements of the customer. The fixture on the machine shown above in the illustration is built on the table of a standard four position power indexing table.

Only two positions are utilized, which permit the operator to load one forged aluminum cylinder head while the work is in progress in the second station. The part is then automatically indexed, which eliminates loss of machine time for loading and unloading. The fixture incor-

porates standard drill bushing guides which are necessary to guide the multiple cutting form tools in heavy machining operations.

The cylinder heads center in a locating ring and are positioned by means of two dowel pins. Hold down is accomplished by two quick acting cam locking and hand clamps. Note that these fixtures can be replaced by other fixtures in order to hold entirely different parts when desired.

New **IDEAL** **GOLD BAND**

LIVE CENTERS

GUARANTEED TO MATCH ACCURACY
AND CAPACITY OF YOUR LATHES

In the **GOLD BAND** line Ideal has combined the latest production methods with their traditionally fine craftsmanship to bring you an unequalled standard of excellence in live centers. Accurate, (to $\pm .0001"$) **GOLD BAND** Live Centers offer "custom" quality at production prices. Specify **GOLD BAND** Live Centers and your every need can be accommodated from stock . . . 99 times out of 100. Ideal's **GOLD BAND** Live Centers offer savings, simplified operations and higher lathe output both in quantity and quality. Contact your distributor today!

A COMPLETE LINE FOR EVERY
NEED—SPECIALS TOO!




IDEAL INDUSTRIES, Inc.
1031-F Park Ave.
Sycamore, Illinois

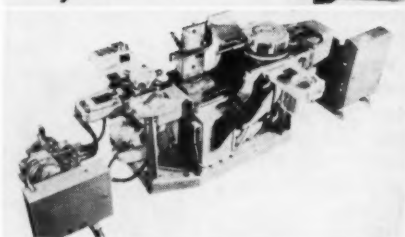
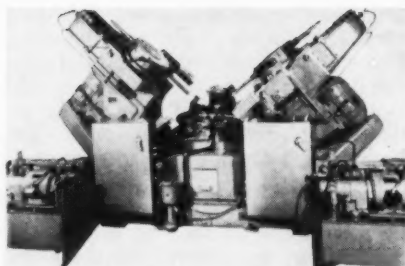
For more data circle 499 on Postpaid Card

Write for
Complete catalog data
and specifications.

new shop equipment . . .

The second machine is unique in that it utilizes both a six and an eight spindle turret, which are mounted in a horizontal plane for carrying out a sequence of machining operations on opposite ends of valve bodies. The special holding fixtures locate and hold a single valve body at a time. By changing fixture and tools and resetting the speeds, feeds and depth controls, the machine can be setup for machining other sizes of valve bodies or other work, when desired.

Although possessing all of the advantages of special machine tools, these machines can be readily changed over from one part to another to provide maximum flexibility. All that is required is replaceable holding fixtures and proper cutting tools to make a shift from one part to another. The



Standard Burgmaster Model 2BH Six Spindle and Model 3BH Eight Spindle Automatic Hydraulic Turret Drilling Machines

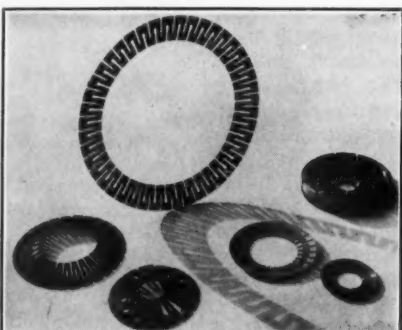
Spin Your Rivets Faster on the NOISELESS LINLEY RIVETER



Cut production costs with the Linley. Quickly produces finely finished rivets. Takes rivets up to $\frac{3}{8}$ " in diameter in iron and cold rolled steel; even larger sizes in brass, aluminum and other soft metals. Send sample parts to be riveted and without obligation we will give you cost and time estimates of doing the job the easy Linley way.

Send Today For Bulletin R
LINLEY BROTHERS CO.
Also Builders of Jig Bore
671 State St. Ext., Bridgeport 1, Conn.

For more data circle 500 on Postpaid Card
230 modern machine shop



RINGSPANN DISCS For Mechanically connecting and concentric holding of parts.

CHARACTERISTICS: • Easy construction. • Precise, efficient holding with automatic concentric adjusting. • Positive, rigid holding with powerful clamping forces, easily controlled. For Chucking—inside, outside. Fastening of eccentrics, pulleys, gears, dials, scale discs to shafts, etc. Many other applications.

Now being introduced to U. S. Industry by

**NEISE
MODERNTOLDS**

KARL A. NEISE
404 Fourth Ave., Dept. MMS
New York 16, N. Y.

For more data circle 501 on Postpaid Card

June, 1958

standard built in adjustments for spindle depth control, preselective speeds and feed controls are quickly used to change the machine for a different set of machining operations.

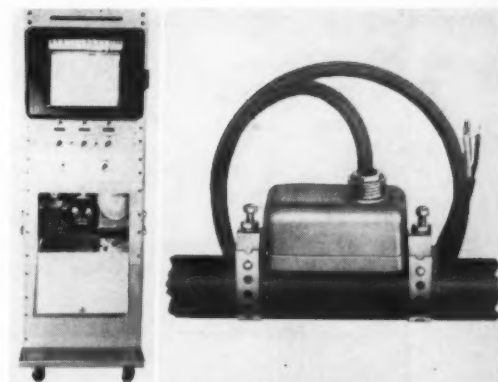
Therefore, one such machine can be used for a series of different parts, and model changes in no way obsolete the equipment.

For more data circle 122 on Postpaid Card

★ modern machine shop ★

ELECTRONIC INTEGRATOR AND SUMMER-WINTER THERMOSTAT

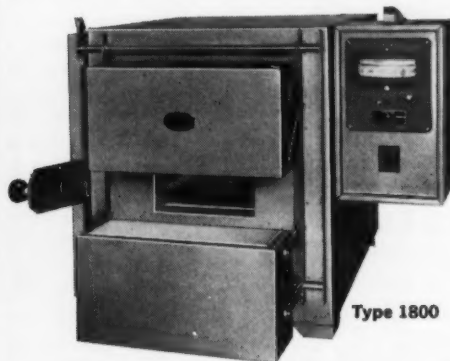
A Summer-Winter Changeover Thermostat has been designed by the Barber-Colman Co., 24 Loomis St., Rockford, Ill., for use on combination heating and cooling air conditioning units. It will effectively sense the temperature of the supply media and reverse the control action of the room thermostat sensing element to comply



(Left) Wheelco Recorder-Integrator Panel showing five digit component counters and integrator elements; (Right) Barber-Colman Summer-Winter Changeover Thermostat

with the flow of either hot or chilled water. In addition, this thermostat has applications in process control.

the new BIG bench-type furnace for heavy production heat-treating



Type 1800

An all-new TEMCO electric furnace specifically designed to let you heat-treat more and bigger parts in a bench-type unit. Larger chamber size . . . 10" W, 9½" H, 22" D. Higher temperature range . . . continuous up to 2000° and 2300° F (1095° and 1260° C) . . . handles most high-speed steels.

This new Type 1800 TEMCO furnace features a close-sealing sectional door with patented lever suspension to provide limited or full access as desired. Reinforced welded steel case . . . 7½" firebrick and backup insulation. Choice of single or three-phase models, with or without controls. \$570 to \$620 furnace only.

Write for new TEMCO Catalog and name of nearest dealer.



ELECTRIC FURNACES

Thermo Electric Mfg. Co.

488 Huff Street, Dubuque, Iowa

For more data circle 502 on Postpaid Card

new shop equipment . . .

Its switch action is single-pole, double-throw snap-acting. It has a non-adjustable control point setting at 70 degrees and a fixed differential of approximately 15 degrees. The thermostat is factory sealed to prevent condensation from forming on its contacts. It may be mounted in any posi-

tion and comes equipped with mounting strapped for easy installation.

The company has also announced an electronic integrator with an unusually fast counting rate. Developed for use in chromatographic applications to measure the relative quantity of components in gas mixtures, the electronic integrator is said to be equally adaptable to other industrial processes where it is desirable to have the

measured variable integrated. The integrator has been designed for use with the Wheelco 8000 Series Potentiometer type strip chart recorder.

The unique circuitry used for the electronic integrator incorporates a conventional watt hour meter. In this circuit, a transmitting slide-wire in the recorder provides a means of supplying a low voltage a.c. signal to an electronic amplifier which, in turn, provides a signal to the current coil of the watt hour meter. With the alternating current signal being proportional to the recorder pen position, the rotation rate of the disc of the watt hour meter is also proportional to the recorder pen

BRAND NEW NAME PLATE MARKER

SCHMIDT PNEUMATIC PLATE STAMPER

- Power operated
- Flexible
- Designed for safety
- Simple operation
- Eliminates fatigue



This GTS designed and built machine guarantees that your plates will be marked with perfect precision: alignment, spacing and depth of characters.

Get all the facts about the GTS Pneumatic Plate Stamper . . . Write for complete information today.

GEO. T. SCHMIDT, INC.

1806 West Belle Plaine Avenue
Chicago 13, Illinois

**IF IT'S
WORTH
MAKING,
IT'S WORTH
MARKING**

For more data circle 503 on Postpaid Card

position. Light pulses through orifices in the watt hour meter disc are electronically sensed and amplified to serve as a signal for: (1) driving the counting pen motor on the recorder, (2) driving high speed read out counters for component and/or totalized count, and (3) feeding storage amplifier or memory circuits for various print out purposes.

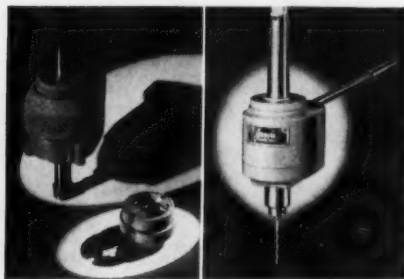
For more data circle 123 on Postpaid Card

★ modern machine shop ★

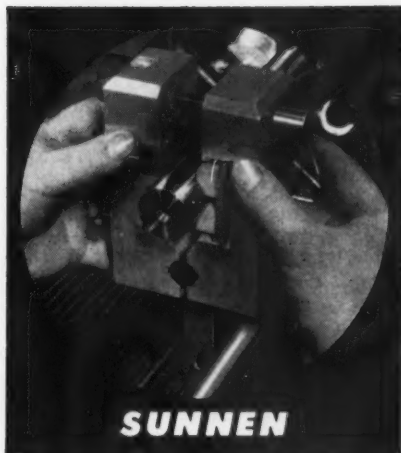
CLUTCH FOR TAPPING HEADS AND DRILLING AND TAPPING ATTACHMENT

Jarvis Corp., Middletown, Conn., has announced the design and development of a completely new clutch which will be standard in every model of the Jarvis Torqomatic Tapping Head. Straight-line action of the clutch offers a 100 percent driving surface, doubling its power. This basic design feature also provides sensitive, rapid response to light pressure on the drill press lever and insures easy, accurate tapping.

Clutch life has been more than doubled, due to the drive always being evenly distributed over the entire surface of the clutch facing. The complete line of Jarvis Torqomatic



(Left) Clutch for Jarvis Torqomatic Tapping Head and (Right) Drillspeeder Attachment



EXTERNAL HONES

SAVE MANY HOURS IN YOUR
TOOL ROOM OR MACHINE SHOP

They produce exact size, mating fit or surface finish on O.D.'s of... plug gages, shafts, arbors, spindles, pistons, plungers, leader pins, ejector pins... many others.

Guaranteed to produce geometric accuracy to "split-tenths" with surface finish as low as 2 micro-inches.

They correct all errors such as waviness, centerless grind chatter, bow and taper. Invaluable in production, job lot or tool room work.

They combine speed of honing with precision of lapping. Parts to be honed can be driven by lathe or Sunnen Honing Machine.

Available in 4 sets:

$\frac{1}{8}$ " - $\frac{13}{32}$ ", $\frac{13}{32}$ " - $\frac{13}{16}$ ",
 $\frac{13}{16}$ " - $1\frac{1}{2}$ ", $1\frac{1}{2}$ " - $2\frac{3}{4}$ " diameters.

WRITE FOR FREE BOOKLET

Find out how SUNNEN
EXTERNAL HONES
can help you.

7899

For more data circle 504 on Postpaid Card

modern machine shop 233

MINIATURE DRILL BUSHINGS

Hole Sizes—No. 80 to 3/32"

O.D. 3/32" to 13/64"

Lengths 1/4" to 3"

.0002 Tolerance on I.D.

O.D., and Concentricity

Specials to your specifications

WRITE FOR CATALOG

PREBCO BUSHING CO.

14702 East Arrow Hwy., Baldwin Park, Cal.

For more data circle 505 on Postpaid Card



**DIAL CALIPER
Repair Service**

ELISHA PENNIMAN

Precision Tools

Elmwood 10, Conn.

For more data circle 506 on Postpaid Card



COMBINED DRILLS



and COUNTERSINKS

- Both old and new series carried in stock for immediate delivery. Finest high speed steel. Ground spiral flutes. New standard simplifies and improves size progression. New comparison chart mailed on request. Shows new standard sizes—both plain and bell type, including long series, 4"-6" in stock. Specials to your blue prints.

KEO CUTTERS, INC.

25040 Easy Street

Warren, Mich.

For more data circle 507 on Postpaid Card

234 modern machine shop

new shop equipment . . .

Tapping Heads, incorporating this straight-line clutch, has also been redesigned for ruggedness, accuracy and dependability to meet the tapping requirements in industry today.

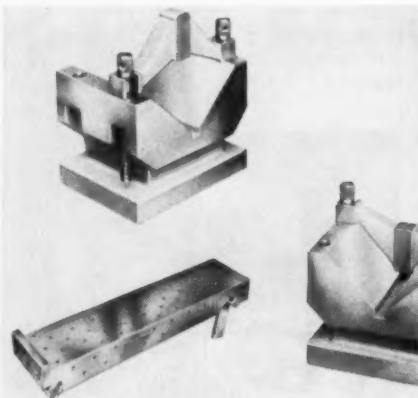
The company has also announced the "Drillspeeder," which is the newest addition to its line of drilling and tapping attachments. The Drillspeeder has a maximum speed of 30,000 r.p.m. and is adaptable to any conventional style of drill press spindle, quickly converting it into a high speed drilling machine. The Jarvis Drillspeeder permits the use of solid carbide drills and reamers and is ideal for high speed drilling of small holes.

For more data circle 124 on Postpaid Card

★ modern machine shop ★

VEE BLOCKS AND 20 INCH SINE BLOCK

Taft-Peirce Manufacturing Co., Woonsocket, R. I., has announced a



Taft-Peirce Style No. 9132 matched set of vee blocks and 20 inch sine block

June, 1958

37%
which
can
Taft
capa
ter.
will
inche
A
able
for
He a
const
vides
secti
lute
accu
is o
with
surfa
grou
Bl
used
tion
terf
clam
tions
9132
surf
top a
para
oth
0.000
cent
side
with
squa
with
Two
clam
nishe
pair
block
mat
only
ident
Th
stand
zine
been
inclu

June

3 7/8 inch capacity vee block, with which machine shops and toolrooms can now obtain a complete line of Taft-Peirce vee blocks, with holding capacity up to 6 3/8 inches in diameter. Designated as Style No. 9132, it will hold workpieces from 1/2 to 3 7/8 inches in diameter.

A special feature is the quick detachable and reversible swing clamp design for maximum flexibility and utility. Heavy duty construction provides a massive section for absolute rigidity and accuracy. Casting is of Meehanite with all working surfaces precision ground.

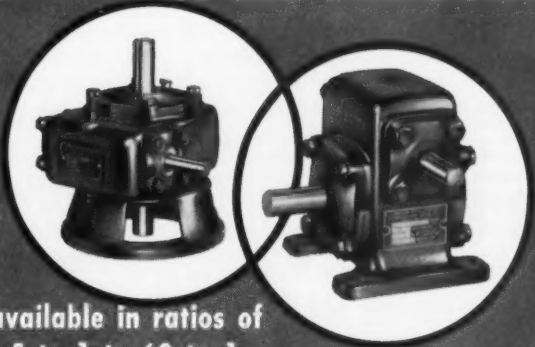
Blocks can be used in any position without interference from clamps. Specifications of the No. 9132 include: all surfaces except top are square or parallel with each other within 0.0002 inch; vee is central with the sides, parallel with bottom and square with ends within 0.0003 inch. Two forged steel clamps are furnished with each pair of blocks; blocks are sold in matched pairs only, each pair of identical size.

The company's standard line of zinc blocks has been expanded to include a 20 inch

model, developed especially for toolmaker's use in checking and measuring larger work.

Designated as the Model 9118-20, it combines the features of a 20 inch sine bar with a right angle iron. Work may be easily clamped to the block by using tapped holes which are available on all working surfaces. Sine plugs, 3/4 inch in diameter, provide a line contact wherever desired throughout their 2 1/8

PERFECTION worm gear SPEED REDUCERS



available in ratios of
5 to 1 to 60 to 1

Perfection Worm Gear Speed Reducers by American Stock Gear are available in 9 complete series with ratios ranging from 5 to 1 to 60 to 1 for input revolutions ranging from 300 per minute to 1800 per minute. Speed Reducers are furnished in horizontal right angle drive with worm in either top or bottom position and are also furnished in vertical right angle drive. Shafts are mounted in Timken anti-friction roller bearings. Oil seals are of selected cirvis leather which assures maximum sealing effect. Available through your nearest American Stock Gear Distributor.

Write for new 16 page catalog covering the complete
PERFECTION Speed Reducer line.

AMERICAN STOCK GEAR DIVISION
PERFECTION GEAR COMPANY • Harvey Illinois, U.S.A.

For more data circle 508 on Postpaid Card

JIG BORING

and

Large Precision Machining

Done to your specifications

We have 22 Jig Borers

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 509 on Postpaid Card



DRILL THESE HOLES

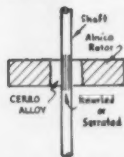
BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

For more data circle 510 on Postpaid Card

HOW TO . . . Anchor Shafts in



Alnico Rotors,
quickly and accurately

. . . with
CERRO ALLOYS

Permanent magnet alternator rotors are securely "keyed" to shafts with bismuth-tin alloys (CERRO ALLOYS). Low-temperature-melting CERROTRU® or CERROMATRIX® is poured into the space between shaft and oversized hole cast in rotor. An alternate method is to completely fill the cored hole with CERRO ALLOY, then drill for a press fit. The aftergrowth of the expanding, solidifying CERRO ALLOY develops a positive holding pressure...firmly anchoring the splined or serrated shaft and rotor.



Send for Bulletin A-1, and the
CERRO ALLOY "HOW TO"
applications booklet.

CERRO DE PASCO
SALES CORPORATION

304 PARK AVENUE, NEW YORK 22, N. Y.

For more data circle 511 on Postpaid Card

236 modern machine shop

new shop equipment . . .

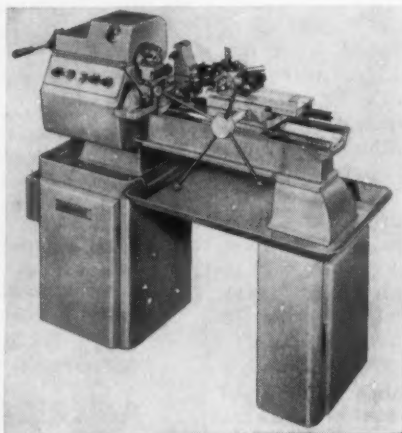
inch length. Tolerances and specifications include: top surface ground parallel within 0.0001 inch to the center line of sine plugs. Sine plugs are identical diameters located 5.000 plus or minus 0.0002 inch from center to center. They are manufactured from alloy steel and are hardened and ground all over. The working surface is flat, square with sides and parallel within 0.00020 inch; cylinders round and straight within 0.00006 inch. Dimensions are: center distance 20 inches, 5¼ inches wide, 2½ inches high and the weight is 35 pounds.

For more data circle 125 on Postpaid Card

★ modern machine shop ★

HIGH SPEED TURRET LATHE

Sheldon Machine Co., Inc., 4250 North Knox Ave., Chicago 41, Ill., has introduced a high speed turret lathe for secondary operations and production jobs. The turret lathe combines



Sheldon Model ZWM-46 P Hand Turret Lathe

June, 1958

increased power and capacity with new modern styling and controls. The versatility of the 13 inch swing over the bed ways and large 1-1/16 inch collet capacity are said to make the lathe ideal for both chucking and precision collet work.

Variable spindle speeds ranging from 40 to 2,000 r.p.m. are selected automatically by fast-slow pushbutton controls. Actual spindle speeds are read from a built in tachometer located in the headstock.

The lathe has a production type hand lever collet attachment with 1-1/16 inch collet capacity. There is a six station ram turret that accommodates up to 1 inch shank turret tools.

A heavy duty cross slide with front and rear tool blocks has screw operated wedges for easy height adjustment of cutting tools. Tee slots in the slide permit universal adjustment of both tool blocks.

For more data circle 126 on Postpaid Card

★ modern machine shop ★

WEAR PLATES FEATURE BRONZE PLATED BEARING SURFACES

A line of wear plates is currently being produced by Lamina Dies and Tools, Inc., P. O. Box 31, Royal Oak, Michigan.

Designed for use wherever there is sliding contact between flat metal parts, Lamina Wear Plates are made of steel and electroplated with a bronze bearing surface.

The wear plate design is said to combine the low cost, ready machinability and solid backing of steel with the long wearing non-seizing, free-running properties of a copper-tin bronze alloy bearing surface. The bearing material actually becomes an integral part of the steel itself; it cannot displace under heavy loads. Considerable savings in material are also claim-

NOs for News

Our Laminum Shims are good news for thousands of metal working plants, because our "NOs" save time and reduce costs.

NO machining



NO grinding



NO counting



NO stacking



NO miking



And only in Laminum are laminated, surface-bonded shims available in all four materials as shown below.

LAMINATED SHIMS OF



STAINLESS STEEL

with laminations of .002" or .003"

LOW CARBON STEEL

with laminations of .002" or .003"

BRASS

with laminations of .002" or .003"

ALUMINUM

with laminations of .003" only

LAMINATED SHIM COMPANY, INC.

Shim headquarters since 1913

3306 Union Street, Glenbrook, Conn.

For more data circle 512 on Postpaid Card

modern machine shop 237

new shop equipment . . .

ed, since the process deposits bearing material only where it is needed, on the wear surface.

Lamina Bronze Plated Wear Plates are furnished in popular thicknesses and widths, flat and parallel, and can be machined to suit the application. For more data circle 127 on Postpaid Card

FLOATING REAMER HOLDER IS SELF-CENTERING AND ADJUSTABLE

A self-centering, adjustable floating reamer holder, designed for precision reaming, quick and accurate setup, is now available from RoyEL Tools, 4221 Excelsior Boulevard, Minneapolis 16, Minnesota.

The floating feature of this holder is simplicity itself. The master bushing with convex base engages a concave, loose seating disc. After setup, the set screws, which center the bushing, are loosened slightly and the bushing is permitted to float. The bushing has been designed to accommodate a wide range in sizes of reamers. Thus, the holder is complete in itself—no accessories are needed.

This holder is available in two sizes: No. 0, with a capacity from 1/16 to 9/32; and No. 00, with capacity from 1/16 to 19/32 inch.

For more data circle 128 on Postpaid Card



RoyEL Reamer Holder

LUBRICATION ECONOMY

LUBRIPLATE No. 630-2 Multi-Purpose Grease

ALSO PACKED IN CONVENIENT GREASE GUN CARTRIDGES

Lubriplate No. 630-2 is a high temperature, extreme pressure, water-repellent, grease type lubricant. Ideal for the general lubrication of Industrial, Automotive, Construction, Farm and Marine Equipment. Lubriplate Grease Gun Cartridges provide an easy, quick, economical means of application. Prevent the waste and mess of hand filling. Packed 10 Cartridges in a handy carrying carton.



Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

LUBRIPLATE DIVISION
Fiske Brothers Refining Co.
Newark 5, N.J. or Toledo 5, Ohio

*The Different
LUBRICANT!*

DEALERS EVERYWHERE, consult your Classified Telephone Book

For more data circle 513 on Postpaid Card

ROTARY SURFACE GRINDER HANDLES WORK UP TO 6 INCH OUTSIDE DIAMETER

A rotary surface grinder, ideally suited to small work grinding operations on a high production or job-lot basis, has been introduced by The Heald Machine Co., Worcester 6, Mass. Designated as the Model 161, the machine grinds flat, convex or concave surfaces of work up to 6 inches o.d. This column type machine can produce finishes of 2 to 4 microinches in suitable types of material in routine production. It will accommodate a wide range of relatively small work such as saw blades, slitters, gear cutters, matched angular contact bearings and similar parts.

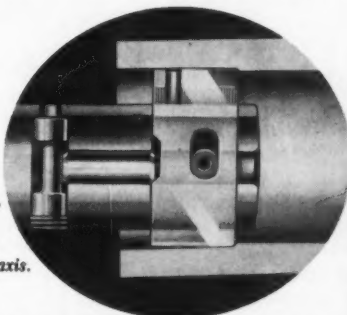
A feature of the machine is hydraulic control of the operating cycle. Automatic table reciprocation saves operator effort and permits high uniform production on relatively long runs of identical parts. Hydraulic table feed rates are infinitely variable from 0 to 10 f.p.m. to permit smooth, slow dressing speed and instant change to rapid

traverse or reciprocating speed. The Model 161 is also available as a manually operated machine, which can be changed over to hydraulic operation by adding a power pack.

The 6 inch magnetic chuck can be swiveled 15 degrees for precision grinding of convex or concave surfaces. The unit has a 10 inch vertical capacity to center of wheel, 4 inch grinding stroke and 12½ inch swing inside of the guard. Provision is made

THIS SPECIAL FLOATING MOUNT...

Bores More Accurately, Makes Smoother Finishes!



Notice how
the blade "floats"
laterally, centers
itself to the bore axis.

Clark ADJUSTABLE FINISHING BARS with Cam-Lock Floating Mount (Also available in types for rough boring)

Here's the bar that automatically corrects for misalignment between turret and spindle! The double-lipped blade floats in the bar, centers itself to the spindle axis! Chip load is equalized between cutting lips. Result... smoother, faster finishing; accurate diameters from end to end!

Exclusive Clark Cam-Lock permits instant removal of blades for resetting *without disturbing the set-up!* Micrometer adjustment varies blade diameter. Available in M-3 H.S.S. or carbide tipped. Sizes ½" to 6" I.D. Others on special order. Write for data!

Robert H. Clark Company

9330 Santa Monica Blvd., Beverly Hills, California
For more data circle 514 on Postpaid Card



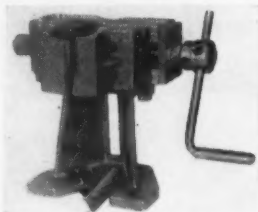
new shop equipment . . .

for wet grinding type of operations.

A dial knob type feed box permits incremented vertical feeds of 0.0001 inch from 0 to 0.0006 inch for rough grinding, changing automatically to 0.0001 inch fine feed at any point from 0 to 0.005 inch before finish size.

WORK HOLDING UNIT

cuts tooling and production time

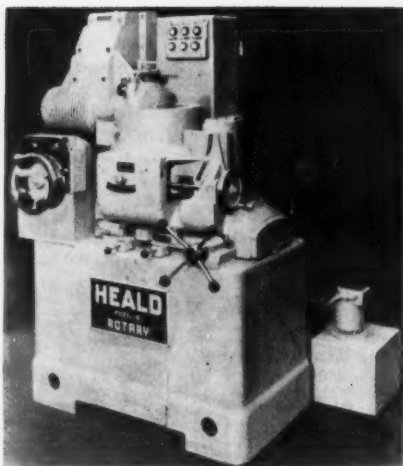


The self-centering John's Drill Jig is ideal for cross or end drilling round, hexagon or

square stock, standard or odd-shaped rough castings, from $\frac{1}{8}$ " to 8" O.D. Holds within .0015" or better. Will cut costs on 10 to 100,000 pieces.

NEW QUICK TOOL JAWS—cast iron jaws made to fit all three sizes of John's Drill Jigs. Jaw cavities accept a piece part or casting and a quantity of Devcon "the plastic steel," producing an inexpensive "throw-away" form fitted work holding unit. For information write to: Heuser Mfg. Co., 1650 N. Paulina St., Chicago 22, Illinois.

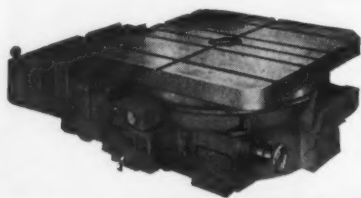
For more data circle 515 on Postpaid Card



Heald Rotary Surface Grinding Machine

Easy manual reciprocation is provided by anti-friction table ways; the 590 pound table can be moved by four ounces of pressure. Contributing to the low microinch finish possible are a welded steel base, cradle type chuck bracket and swivel adjustment that minimizes chatter and a vibration free diamond which gives the wheel a smooth dress. The machine occupies floor space of only slightly over 2 by 3 feet and can be installed in a total projected floor area, including door swing of less than 4 by 5 feet.

For more data circle 129 on Postpaid Card



FASTER set-ups and positioning

You save set-up and positioning time with Gilbert rotary tables. *Hand-indexing:* 36" and 50" square or round. *Power rotary and power feed:* 36", 50", 60", and 72" square or round. Special tables built to your requirements. For complete descriptions and specifications, write for Bulletin 854.

THE CINCINNATI **GILBERT** MACHINE TOOL COMPANY • CINCINNATI 23, OHIO

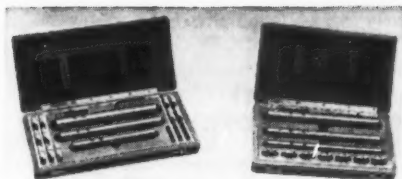
For more data circle 516 on Postpaid Card

REAMER KITS

Two reamer kits, that make possible reaming a wide range of hole diameters with a minimum tool inventory, have been introduced by Madison Industries, Inc., Muskegon, Mich.

Both kits offer immediate accessibility to production reamers, provide special diameters without regrinding and are made up in compact, solid mahogany boxes requiring minimum storage space. Kit No. 1122 features three bars and seven cutting heads which can ream any hole from $\frac{3}{8}$ to 1 inch in diameter. Kit No. 1123, with three bars and 14 cutting heads, makes possible reaming of holes from 1 to 2 inches in diameter.

Tools in the kits feature micro-adjustability; balanced, floating cutting action for accurate, smooth reamer finishes; and cutter expandability for extensive resharp-ening allowance. They are made of fine high speed steel for long cutting life between grinds and can be run at full surface speeds without loss of accuracy or surface finish. For more data circle 130 on Postpaid Card



(Left) Madison Industries No. 1123 Reamer Kit and (Right) No. 1122 Reamer Kit



These firms approve its precision, enjoy its low cost.

Airesearch Mfg. Co.
Allison Div.
Apex Electrical Mfg.
Bendix Aviation
Bulck Motor Div.
Century Electric Co.
Chicago Pneum. Tool
Chrysler Corp.
Continental Motors
Curtiss-Wright
Detroit Transmission
Douglas Aircraft
Fairchild Engine &
Airplane Co.
Falk Corp.
Ford Airplane Engine
Ford Motor Co.
General Electric Co.
Hamilton Standard Div.
Harris Seybold Co.
Homelite Corp.
Hughes Aircraft Co.
Int. Harvester Co.
Jacobs Mfg. Co.
Lycorning-Spencer Div.
McDonnell Aircraft
Montrose Div. Bendix
National Lead
Northrop Aircraft
Pontiac Motor Div.
Scintilla Magneto
Steel Products Eng.
Studebaker-Packard
Sylvania (Atomic Div.)
Warner Gear Div.

COMTORPLUG

Expanding
Internal
Gage

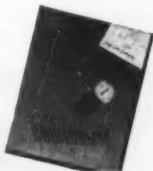
for holes $\frac{1}{8}$ "
to 10" dia.



They **BUY** its Precision
They **ENJOY** its Economy

No need to tell you that firms like those listed here, would buy only **ASSURED PRECISION** in a gage to control volume production of precision holes—at machine—at bench. In Comtorplug, they **GET** assured precision—but in addition are pleasantly surprised at its economy . . . also how easy it is to put it to work; no air hose, no electronic maze, no heavy base, no indoctrination. If **YOUR** production calls for precision holes $\frac{1}{8}$ " to 10" dia. within .0001", by all means send for Comtorplug details.

Comtor Co.,
64 Farwell St.,
Waltham 54, Mass.



REQUEST BULLETIN 50 ➔

For more data circle 517 on Postpaid Card

new shop equipment . . .

SUPER COBALT HIGH SPEED DRILLS

Drills manufactured from special cobalt high speed steels have been announced by Chicago-Latrobe, 419 West Ontario St., Chicago 10, Illinois.

They have been designed for tough drilling applications where it is not



Chicago-Latrobe Cobalt High Speed Drill

possible to use conventional high speed drills due to red heat, where high speed drills anneal.

Applications for the super cobalt drills are in work hardened stainless steels, hardened laminated safe steels,

silicon chrome and certain chrome nickel alloy steels, armor plate acid resistant castings and forgings, or similar metals generally considered outside the range of regular drills.

They are available in taper shanks in fractional sizes and in jobbers, letter and wire gauge sizes. A bonding bit is also made for drilling rail bond heads.

For more data circle
131 on Postpaid Card

★ m m s ★

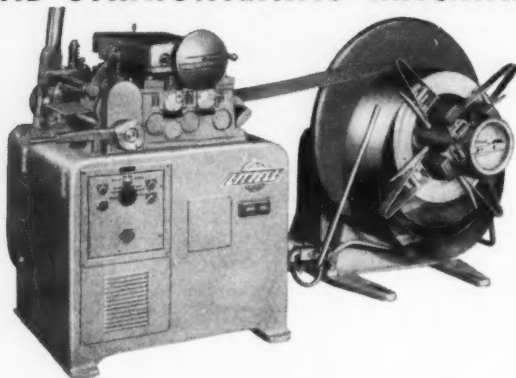
PRECISION LIVE CENTER

A complete line of newly designed precision live centers has been introduced by R. B. Tool Co., Inc., 785 North Broadway, White Plains, New York.

The new line features Live Cen-

Speed Stamping Output with...

LITTELL HYDRAULIC DRIVEN FEEDING AND STRAIGHTENING MACHINES



Smooth, powerful Littell No. 4 Series Rack and Pinion machines straighten coil stock up to .125" thick and feed it automatically to any type of punch press or square shear. They feed up to 16" lengths at standard speed, 40 SPM. Set in double cycle, they feed up to 32" lengths at 20 SPM. Used primarily in single station blanking or compound blanking and drawing operations. Also feed to multi-station dies where the final station location is by solid or disappearing stop. Easily moved about by fork truck. Write for Catalog Section "B."

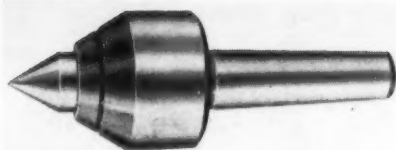


Speed
with Safety

F. J.
ROLL FEEDS • COIL CRADLES
STRAIGHTENING MACHINES
REELS • AIR BLAST VALVES

District Offices: Detroit, Cleveland

4163 N. RAVENSWOOD AVE. • CHICAGO 13, ILL.
For more data circle 518 on Postpaid Card



R. B. Live Center with low overhang

ters and Bull-Nose Centers for light and heavy duty available from stock in all standard sizes with straight shanks and Morse Taper Shanks Nos. 1 through 6.

R. B. Precision Live Centers have an unusually low overhang and a recessed body for better clearance. Special high precision "angular contact" bearings allow accuracy of concentricity up to 0.000075 inch.

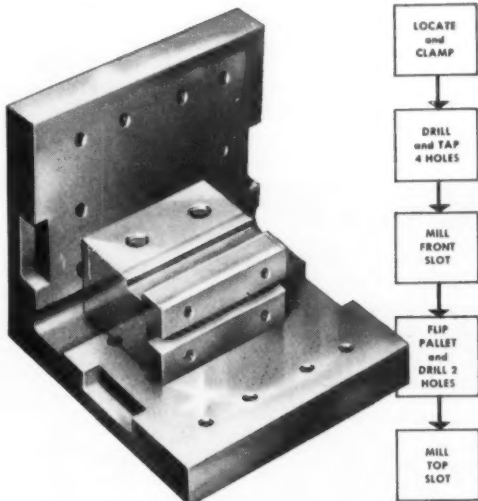
For more data circle 132 on Postpaid Card

★ m m s ★

MILLING MACHINE ARBOR

A new type of milling machine arbor, replacing six or eight milling arbors now available from A. and H. von Tsurikov, Precision Machinery and Tools, 755 Lake Avenue, Rochester 13, New York.

It consists of a base arbor, which always remains in the spindle, and three or four interchangeable centering inserts of different diameters. These inserts, guided for their entire length, absorb completely the axial and radial forces and are clamped from the front with a long special screw with high clamping power. This results in a rigid connection between the milling cutter and the arbor of every milling operation in both right and left hand



New Pallet Iron...Single, All-Purpose Fixture Holds Work Through Multiple Operations

This Taft-Peirce Pallet Iron replaces special work-holding fixtures by providing a single all-purpose base for work clamping and station-to-station transfer.

Rugged, highly accurate. Ten tapped holes through each face and convenient clamping pockets on both sides. Inside and outside working surfaces precision ground and held parallel within .0003" on the 8" model, and .0004" on the 10" model. Adjacent sides square within .0005" in 6" on both models. Overall dimensions held to plus or minus .005" and thickness of legs to plus or minus .0005".

Order now for both toolroom and production line, and watch setup costs reach a new low. Delivery from stock. Send for Data Sheet ST-003.

TAKE IT TO

TAFT-PEIRCE

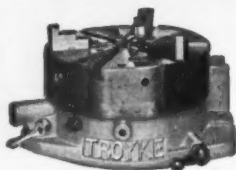


TAFT-PEIRCE MANUFACTURING CO.
Woonsocket, Rhode Island

For more data circle 519 on Postpaid Card

TROYKE

ROTO-INDEXER



INDEXING

Rapid

•

Positive

•

Accurate

**CHUCK or T-SLOTTED INDEXING
TABLES—FOUR MODELS**

Hand operated. Unique patented block out arrangement. Can be used in vertical or horizontal position.

WRITE FOR FREE CATALOG No. 22.



TROYKE MFG. CO.

11296 Orchard Street
Cincinnati 41 (Sharonville), Ohio

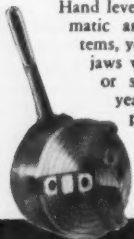
For more data circle 520 on Postpaid Card

LABOR SAVING Production CHUCK

Will pay for itself in 60 to 90 days

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days.

Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.



Top
Jaws
open



Hand lever closes
and locks while
lathe is running.



Jaws locked

Write for bulletin 201 today.

CHUCK DIVISION

THOMAS HOIST CO.

28 S. HOYNE • CHICAGO 12, ILL.

For more data circle 521 on Postpaid Card

244 modern machine shop

new shop equipment . . .



Base arbor together with interchangeable centering inserts and clamping screw

rotations. The manufacturer claims that there is no restriction to the use of milling cutters of varying widths, no breakage of cutters by revolving in the wrong direction and, since the cutters may be changed instantly without changing the base arbor, its use on boring mills is also of special advantage. For more data circle 133 on Postpaid Card

★ modern machine shop ★

FORM AND PUNCH SHAPER

Jersey Manufacturing Co., 442 Livingston St., Elizabeth, N. J., has announced its K-15 Form and Punch Shaper. This universal shaping ma-

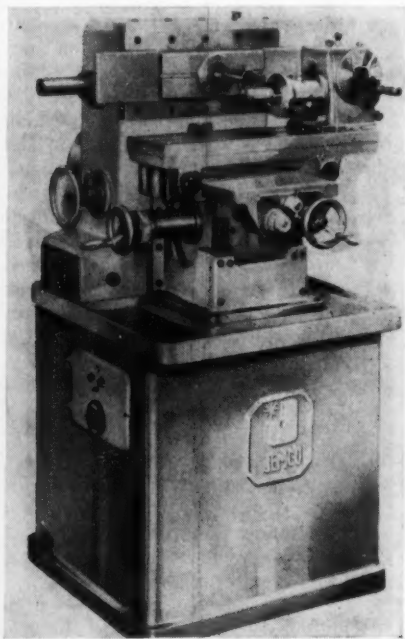
chine
of all
curve
ance
and
all v
parts
poses
such
110;
inche
ing,
radiu
motor
phase
insta
close
to tu
and
sion,
vidin

K-15

June

June, 1958

chine is equipped to produce contours of all kinds, surfaces and punches with curved necks. Parts turned to tolerance of plus or minus 0.00025 inch and with accurate and clean cuts to all worked areas, assure turned out parts considered finished for most purposes. Incorporated into the K-15 are such features as speeds of 50, 75 and 110; a working area up to 6 by 6 1/4 inches; stroke 0 to 6 inch punch shaping, maximum length to beginning of radius 4 3/4 inches; electric direct drive motor 220/440 volts, 60 cycles, three phase; built in lubrication, including instant stopping; and a base with enclosed tool cabinet. With the ability to turn out irregular shaped stamping and electrode punches of high precision, this shaper employs a large dividing head with automatic circular



K-15 Form and Punch Shaping Machine

HELIOS PRECISION DIAL CALIPER

Guaranteed Accuracy
Within .001"
Reading .001"

- **SPEED**
- **PRECISION**
- **DEPENDABILITY**

Full scale readings of 5"-6"-8"-10" available. Also Foot with Scriber to convert to Vernier Height Gage.

Ask for catalog and prices of other Standard Calipers.

6"

\$31.80

F.O.B. New York

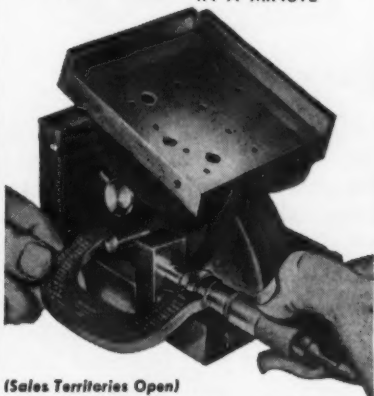


**NEISE
MODERN TOOLS**

KARL A. NEISE
404 4th Ave., Dept. MMS
New York 16, N. Y.

For more data circle 522 on Postpaid Card

PRECISION MADE **BEMISINE** ANGLES TO A MINUTE ... IN A MINUTE



(Sales Territories Open)

**DRILLING — MILLING — JIG BORING
GRINDING — INSPECTION**

Write for Bulletin

Mutual Machine Co., Hudson, Mass.

For more data circle 523 on Postpaid Card

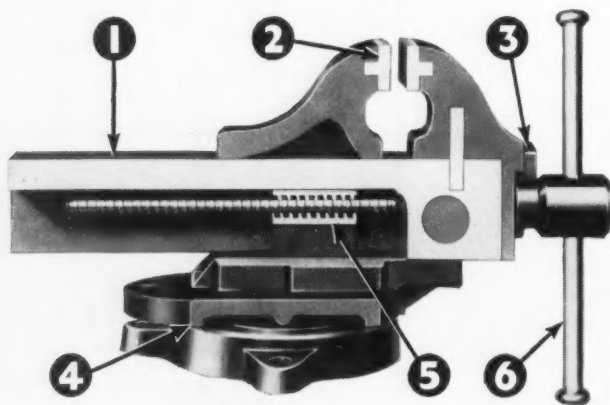
new shop equipment . . .

feed, permitting the machining of radii and angles automatically.

This form and punch shaping machine features a special built in 30 power microscope designed for extremely high precision punches, which permits inspection while the part is being machined.

For more data circle 134 on Postpaid Card

get improved features



pay no more

Desmond-Simplex vises have been redesigned to give you the best value. Standardize on them to get more for your money: **1.** Unbreakable all-steel slide milled from solid bar stock. **2.** Hardened replaceable tool steel jaw face inserts. **3.** Outside screw retainer. **4.** New type positive mechanical locking 360° swivel base. **5.** Longer wearing, stronger alloy steel vise nut. **6.** Non-pinch handle. Write for Catalog No. 80 and the name of your Desmond distributor.

Desmond-Simplex STEEL SLIDE VISES

THE DESMOND-STEPHAN MFG. CO., Urbana, Ohio

For more data circle 524 on Postpaid Card

COMBINATION HACK SAW AND DRILL SAVES PRODUCTION TIME

An easy to use gun shaped combination hack saw and drill that speeds production, saves time and expense by quickly cutting or drilling steel, sheet metal, pipe, rod, tubing, fibre, plastic, wood and wall board, has recently been developed by Modern Manufacturing Co., Inc., 680 Davisville Rd.,

Willow Grove, Pa.

The lightweight, compact tool, known as the Trades - Master, can be converted quickly from a saw to a drill, or vice versa, merely by removing and inserting the tool in the chuck and shifting a knob to the drill or saw position. Current is applied by pressing a trigger switch. As the teeth wear down on the saw blade, the guide can be moved backward until all the blade is used. An adapter chuck is furnished to accommodate any size drill up to and including $\frac{1}{4}$ inch, and other attachments include a flat or rotary file and a nibbler for biting through metal up to 20 gauge. The Trades - Master has been built to stand up under the most severe

Modern

tests a
chined
For m

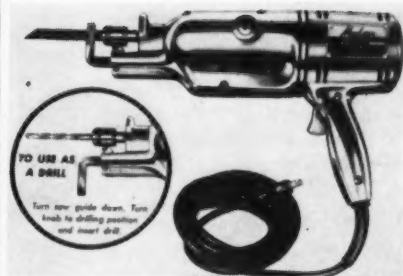
★ m

DIAM FEATU

A r
diamo
four s
annou
431 S
Ill. T
rately
ed in
steel c
perma
cutting
harder
For m

Engis

June



Modern Trades-Master Hack Saw and Drill

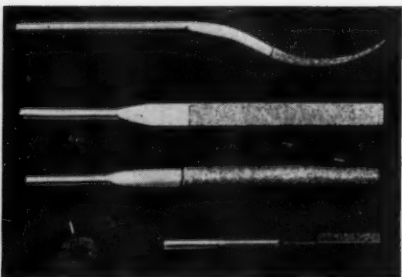
tests and all parts are carefully machined and heat treated for long life. For more data circle 135 on Postpaid Card

★ modern machine shop ★

DIAMOND FILES FEATURE NEW RIFFLER

A ruffle file coated with 90 micron diamond particles and available in four shapes (cross-sections) has been announced by Engis Equipment Co., 431 South Dearborn St., Chicago 5, Ill. The diamond particle are accurately graded and permanently bonded in chrome deposit on a hardened steel core. The points and edges are permanently exposed for most efficient cutting action on carbides, ceramics, hardened and alloyed steels.

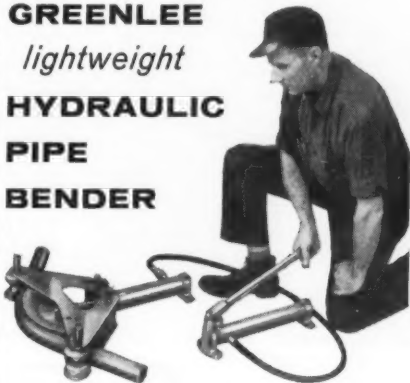
For more data circle 136 on Postpaid Card



Engis Riffle Files in four shapes

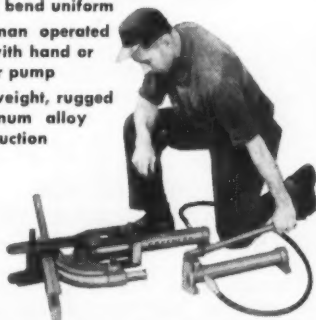
fast, easy way to bend pipe and conduit

GREENLEE lightweight HYDRAULIC PIPE BENDER



Quickly produce your own bends in pipe or conduit for a neat, *exact* fit . . . where and *when* needed! Saves hours, makes a better job.

- Full 90° bend with one ram stroke
- Handles 1/2" to 2" pipe or conduit
- Every bend uniform
- One-man operated . . . with hand or power pump
- Lightweight, rugged aluminum alloy construction



Attachments available for bending steel, copper, brass, and aluminum tubing in sizes 3/4" O.D. to 2 1/8" O.D. Write for details on No. 880 Bender and TU attachments.

Also ask about No. 884 Hydraulic Bender for bending pipe and conduit up to 4" full 90° in one fast stroke.

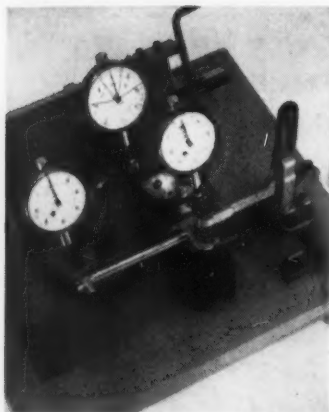


GREENLEE TOOL CO.

1986 Herbert Ave., Rockford, Illinois, U.S.A.

For more data circle 525 on Postpaid Card

modern machine shop 247



SPECIAL GAGES

Federal designs Indicating Gages for inspecting and controlling every type of dimension. Use this invaluable experience when you need accurate, fast and low cost gages which *show* how you're doing. Ask us—we may have already designed and built a gage that will fit your special requirement. You'll save time and money. Contact our local sales engineer or write for recommendations.

FEDERAL PRODUCTS CORPORATION

8146 Eddy Street • Providence 1, R. I.

Ask **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .

For more data circle 526 on Postpaid Card

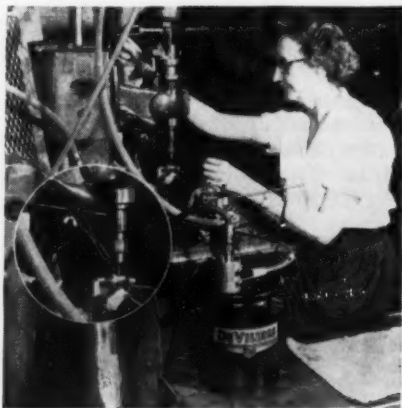
new shop equipment . . .

SPRAY EQUIPMENT FOR COOLING AND LUBRICATING CUTTING TOOLS

Development of spray equipment for cooling and lubricating forming and cutting tools for metal and plastics has been announced by The DeVilbiss Co., Toledo, Ohio.

Called Multi-Mister, the equipment has been designed for use with any cutting tool to supply a fine mist of coolant liquids or light cutting oils at the point of contact between the tool and the material.

The company states that the Multi-Mister will increase tool life, produce better finishes, save coolant material and make chips cleaner and easier to



DeVilbiss Spraying Equipment in use

handle. It can be quickly attached to lathes, mills, screw machines, drill presses, power saws, internal and ex-

ternal grinders, jig borers, high speed presses, broaches and machines not designed to work wet. The equipment operates from the main air line without requiring regulators.

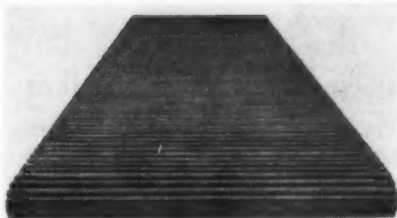
The equipment consists of one or more adjustable tip spray nozzles and brackets for mounting, tough, wear resistant, flexible tubing to carry air and coolant to each nozzle, and supply tank equipped with suction tube, strainer and header to which the tubing is attached. There is no pressure on the tank.

For more data circle 137 on Postpaid Card

★ modern machine shop ★

HARDWOOD SLATTED CONVEYOR APRON

A hardwood slatted conveyor apron was recently introduced by Robert A. Main and Sons, Inc., 28 Pascack Rd.,



R. A. Main Hardwood Slatted Conveyor Apron

Paramus, N. J. Hardwood slats are shown mounted on leather belts. These conveyor aprons can also be made using synthetic belts or chain. Wide aprons can be made to travel around small pulleys in confined spaces. Hardwood slats increase the life of aprons. Conveyor aprons also can be made with metal, aluminum or plastic slats. Aprons can be made in widths up to 14 feet and in any lengths.

For more data circle 138 on Postpaid Card

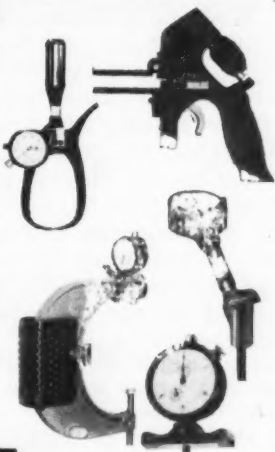
JUST ANY GAGE IS NOT GOOD ENOUGH

Modern requirements for precision gaging are many and varied. To meet these demands, Federal makes available many different types of gages so that you are able to suit not only the type of dimension, but also the degree of accuracy, the type of usage, and the related conditions which the gage should show up. That's why—when you get a Federal Gage—you get more for your money.

Send for catalog—

FEDERAL PRODUCTS CORPORATION

8146 Eddy Street • Providence 1, R. I.



Ask **FEDERAL** First

FOR RECOMMENDATIONS IN MODERN GAGES . . .

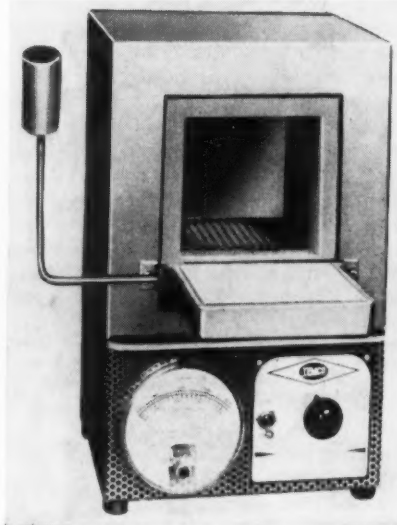
For more data circle 527 on Postpaid Card

new shop equipment . . .

BENCH TYPE ELECTRIC FURNACE

Thermo Electric Manufacturing Co., 488 Huff St., Dubuque, Iowa, has announced the addition of four completely new, utility size electric bench type furnace models to its Temco line. Designated collectively as Type 1300 Furnaces, they all have the same chamber dimensions, case size and general construction, but differ in voltage requirements (115 or 230) and in mode of temperature control. The manufacturer intends these units for such tasks as laboratory testing and experimentation and, in the plant, for process control and small unit heat treating.

The furnace is composed of two sections separated by a $\frac{1}{4}$ inch thick piece of Transite. The upper section



Temco Type 1300 Bench Type Electric Furnace

NUMBERALL

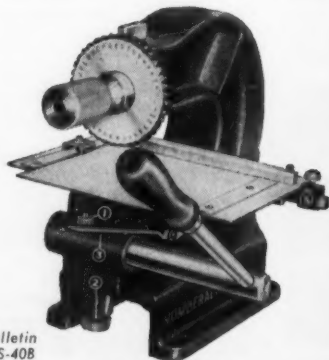
CUTS THE COST OF STAMPING NUMBERS

Numbering and Lettering Press Mono Wheel Automatic Spacer

Designed for the purpose of impressing Letters and Numbers in all kinds of Name Plates and Flat Metal Parts. The Dials $3\frac{3}{4}$ " Diameter are made of Special High Grade Tool Steel, scientifically hardened and tempered. The Characters are carefully engraved and make clear cut impressions of uniform depth. Standard Dials are engraved with 40 characters. Character Heights as follows: $\frac{1}{16}$, $\frac{3}{32}$, $\frac{1}{8}$, $\frac{5}{32}$, $\frac{3}{16}$ ". Different size Dials are interchangeable. Carriage Table advances one space with each impression of the Dial, like a typewriter, doing rapid work, even spacing and perfect alignment.

Plates up to 5" wide and 6" long can be stamped, but can furnish a longer Table and Rack if required. Depth of impressions is adjustable by a screw on bottom of machine. A direct sight gauge is provided, to facilitate stamping in the proper place.

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.



Bulletin
MS-40B
on request.

Model No. 40B

For more data circle 528 on Postpaid Card

has a well insulated 20 gauge steel shell with steel backplate. The hearth collar is composed of firebrick that effectively resists wear. The lower section, which houses the controls, is made of 22 gauge perforated steel for adequate ventilation and cool operation of the controls. The door opens by means of a counterbalanced handle, and in full open position it can serve as a work shelf. The entire furnace is finished in mottled gray enamel, which is heat resistant and easy to keep clean.

For more data circle 139 on Postpaid Card

★ modern machine shop ★

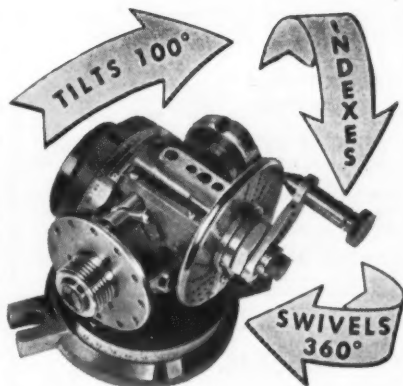
PORTABLE INSPECTION BENCH

Wright Tool Co., 4316 North Woodward Ave., Royal Oak, Mich., is marketing a mobile inspection unit for quality control. Receiving inspection is controlled and eliminates costly scrap material at the machine by 95 percent. It is not necessary to remove gages from the job and take them to a laboratory for inspection. This portable inspection method is claimed to have resulted in better made products, increasing production and reducing re-



Wright Portable Inspection Bench in use

June, 1958



FOR FASTER PRODUCTION

THE ELLIS DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

N
NICHOLS MORRIS
M
CORPORATION

76-H MAMARONECK AVE.
WHITE PLAINS, N. Y.

For more data circle 529 on Postpaid Card
modern machine shop 251

NEW FLUSH PIN AMPLIFIER

OFFERS 5 to 1
AMPLIFICATION



* No dial indicator needed * No master required
* Extremely rugged * Speeds up inspection * .001
to .010 tolerance range. WRITE FOR DETAILS.

HOLMES GAGE & DEVELOPMENT CORP.
Columbus 3, Ohio

For more data circle 530 on Postpaid Card

METRIC DRILLS

Can earn you money, ending ream-
ing, etc., on mongrel holes.

486 Sizes In Stock
.0118" to 1.500"

ELISHA PENNIMAN

Elmwood 10

Connecticut

For more data circle 531 on Postpaid Card

HOW TO . . . Bend Thin-Walled

Tubing, faster and better . . . with



CERRO ALLOYS

For bending thin-walled tubing, CERROBEND® . . . a low-temperature-melting bismuth alloy (CERRO ALLOY) . . . is the ideal filler. CERROBEND is poured into an inclined tube immersed in hot water, then the loaded tube is removed and rapidly quenched in cold water. Upon assuming shop temperature, the loaded quenched tube can be bent over a forming block or in a regular bending machine. The CERROBEND melts out easily in boiling water.



Send for Bulletin H-3, and the
CERRO ALLOY "HOW TO"
applications booklet.

CERRO DE PASCO SALES CORPORATION

304 PARK AVENUE, NEW YORK 22, N. Y.

For more data circle 532 on Postpaid Card

252 modern machine shop

new shop equipment . . .

jects through better, less time consum-
ing accuracy control.

Inspection bench work area is cov-
ered with a shock absorbing vinyl plas-
tic cover providing an ideal surface for
gage or receiving inspection. A raised
ledge around the top prevents tools
and gages from sliding off onto the
floor.

An automatic extension cord can be
pulled out from a spring takeup reel
in order to supply power to the two
outlet plugs, which accommodate elec-
tronic comparator, monochromatic
lights, visual gages or other electric
instruments.

For more data circle 140 on Postpaid Card

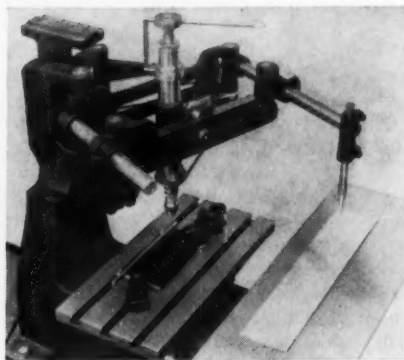
★ modern machine shop ★

DRILL ATTACHMENT FOR USE ON ENGRAVER

H. P. Preis Engraving Machine Co.,
249 Industrial Branch, U. S. Highway
22, Hillside, N. J., has announced a
quick-action drill attachment for its
Model UE-3 Panto Engraver. This at-
tachment enables the operator to drill
any number of holes from an accu-
rate master template. One inch verti-
cal spindle travel is provided and
depth of feed is controlled by a mi-
crometer stop graduated in 0.001 inch
increments. Two precision drill chucks
are available to hold drills from 0.008
to 0.062 inch in diameter or from
0.025 to 0.125 inch in diameter.

With a choice of four cutter spin-
dle speeds, ranging from 7,000 to
18,000 r.p.m. and with pantograph re-
duction ratios from 1.6:1 to 7:1, the
Preis-Panto Engraver UE-3 with drill
attachment is said to be particularly
useful for drilling printed circuits used
extensively in electrical and electronic
products and, also, for drilling, en-

June, 1958



H. P. Preis Quick Action Drill Attachment

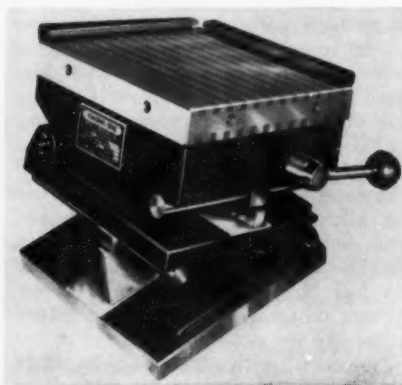
graving and profiling in carbon, plastic and metal plates.

For more data circle 141 on Postpaid Card

★ modern machine shop ★

ANGULAR WORKHOLDING EQUIPMENT

Omer E. Robbins Co., 11961 Dixie Ave., Dept. B, Detroit 39, Mich., has announced that its line of angular workholding equipment now incorporates several new features which make



Robbins Angular Workholding Equipment

June, 1958

Great Buys from

VICTOR

Extra Long, Straight Shank

High Speed Drills

12" OA, 9" FLUTE

SIZE	PRICE	SIZE	PRICE
1/8	1.65	27/64	3.30
9/64	1.75	7/16	3.30
5/32	1.75	29/64	3.60
11/64	1.85	15/32	3.60
3/16	1.85	31/64	3.60
13/64	1.95	1/2	3.60
7/32	1.95	33/64	4.20
15/64	2.05	17/32	4.20
1/4	2.05	35/64	4.50
17/64	2.15	9/16	4.50
9/32	2.15	37/64	4.75
19/64	2.25	19/32	4.75
5/16	2.25	39/64	5.00
21/64	2.50	5/8	5.00
11/32	2.50	21/32	5.40
23/64	2.75	11/16	5.80
3/8	2.75	23/32	6.25
25/64	3.05	3/4	6.75
13/32	3.05		

18" OA, 13 1/2"-14" FLUTE

SIZE	PRICE	SIZE	PRICE
3/16	4.00	9/16	8.75
7/32	4.10	19/32	9.50
1/4	4.10	5/8	10.00
9/32	4.75	41/64	11.00
5/16	4.75	21/32	11.00
11/32	5.25	43/64	12.00
3/8	5.25	11/16	12.00
13/32	6.00	45/64	13.00
7/16	6.00	23/32	13.00
15/32	6.50	47/64	14.00
1/2	7.00	3/4	14.00
17/32	8.50		

Order Today

IMMEDIATE DELIVERY!

VICTOR

MACHINERY EXCHANGE INC.

Dealers in Tool Room Equipment

251 CENTRE STREET, DEPT. B

Tel.: CAnal 6-5575, New York 13, N. Y.

For more data circle 533 on Postpaid Card

modern machine shop 253



*Save Costly
Regrinding!*

**Anderson
NEW, IMPROVED
HAND SCRAPER**

After the original regrinding most users of this new Anderson hand scraper find that only honing is necessary. Judge for yourself: Order as many Model 5-D scrapers as you want. We'll send them promptly. Use them a full week... if they don't live up to all your expectations, send them back to us for refund.

Faster Cutting
Easier to Use
Just the Right Spring
Palm Fitting Grip
Light in Weight
18" - 20" - 22" lengths

\$6.75... with high speed steel blades

\$9.85... with carbide-tipped blades

\$1.75... for rubber bumper shown below

**ORDER AS MANY AS YOU NEED
MONEY-BACK GUARANTEE**

Indicate choice of high-speed steel or carbide-tipped blades, and 18", 20", or 22" lengths. We suggest you include rubber bumpers in your order. Write today for Bulletin No. 6-22.

**ANDERSON
BROS. MFG. CO.**
1807 Kishwaukee St.
ROCKFORD
ILLINOIS

For more data circle 534 on Postpaid Card

254 modern machine shop

new shop equipment . . .

these tools more practical and useful for both large and small toolrooms.

An improvement on both the Robbins Magna-Sine Magnetic Sine Plate and the Robbins Non-Magnetic Sine Plate is the addition of ribbing on base plate and intermediate plates for greater strength and rigidity. Another new feature on both types is an improved locking device which assures positive, foolproof locking, unlocking and relocking without sacrificing repetitive accuracy from one setup to another. The Perma-Flat Swivel Block is now furnished on all models; this feature saves wear on both sine bar rolls and gage blocks and contributes to long life of the equipment. The Magna-Sine has a multi-pole fine division permanent magnet chuck.

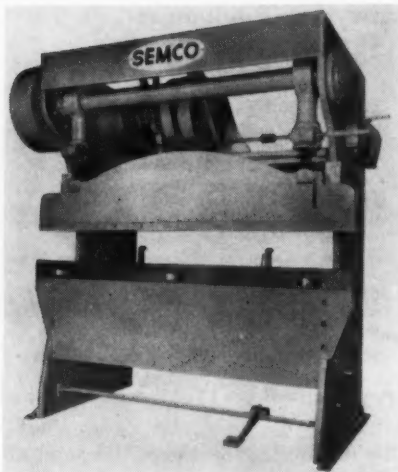
For more data circle 142 on Postpaid Card

★ modern machine shop ★

PRESS BRAKES

Service Machine Co., 242 Miller St., Elizabeth, N. J., has introduced the Models 635 and 835 Semco Press Brakes which offer maximum performance with minimum maintenance plus ease of operation for utmost accuracy of parts. They are now available from stock in new sheet metal forming power press brakes of sturdy welded steel construction. Usual friction factor of operation is practically eliminated as all movable parts have ball or roller bearings throughout, with the exception of alloy bronze bearings on alloyed steel forged heat treated and balanced eccentric crankshaft. Other advantages include heavy forged heat treated steel pitman screws having buttress threads with revolving alloy bronze nuts so designed as not to jam. The entire frame weldment includes solid one piece lower bed, accurately machined after fabrication

June, 1958



Semco Press Brake is available in two models

including $\frac{1}{2}$ by $\frac{7}{8}$ slot in lower bed in exact alignment with ram, allow-

ing accurate setting of large dies when the press is used with the die holder removed. Foot tread pedal operating on ball bearing shaft is adjustable to any position with uniform action at any point of bed.

Both of these models are available from stock and are equipped with motor, electrical controls, die holder and standard back gages.

For more data circle 143 on Postpaid Card

★ modern machine shop ★

THREADING TOOL CUTS 18 THREAD SIZES

Mohr Tool and Manufacturing Co., Box 63-H, Maywood, Ill., has announced a threading tool which will cut 18 different thread sizes from $\frac{1}{8}$ to $\frac{1}{2}$ inch in U.S.S. and S.A.E., plus $\frac{1}{8}$ and $\frac{1}{4}$ inch pipe threads. The timesaving feature of this tool is that

HIGH SPEED PRODUCTION CONTINUOUS OIL GROOVING

WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

*Ask For Descriptive Booklet And See
How You Can Improve Your Production.*

WICACO

MACHINE CORPORATION

4801 STENTON AVENUE
WAYNE JUNCTION, PHILA. 44, PA.

MANUFACTURERS OF

Precision Machinery and Machine Parts
Roller Bearing Twister Spindles—Spindle Oiling Machine
—Screw Machine Products.



SINCE
1868

For more data circle 535 on Postpaid Card

JIG BORING

to your specification

At your disposal: Our sub-contract jig boring department, one of the best equipped in the East.

A. K. TOOL CO., INC.

ROUTE 22, MOUNTAIN SIDE, N. J.

Telephone: ADams 2-7300

For more data circle 536 on Postpaid Card

Accurate Hole Transfer Made Easy With

NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from $\frac{3}{16}$ " to $\frac{3}{4}$ " U.S.S. Inexpensive — Last for years.

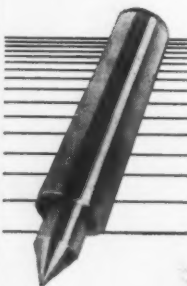


Write for Circular
**NIELSEN TOOL &
DIE COMPANY**

17360 Lahser Road, room 202
Detroit 19, Michigan

For more data circle 537 on Postpaid Card

SPRING LOADED LIVE CENTER



Eliminate excessive overhang of your center. Use the accurate, rugged, reliable *NIROL. The spring loaded Live Center that compensates for expansion and contraction in actual operation.

Write
for complete
information.

*Reg. U.S. Pat. Off.



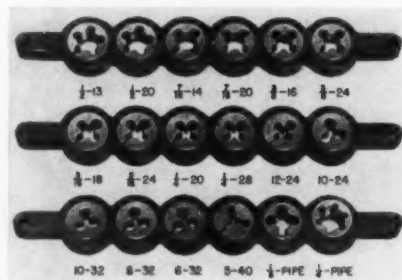
***NIROL** MANUFACTURING
COMPANY

901 H'WAY 22, N. PLAINFIELD, N. J.

For more data circle 538 on Postpaid Card

256 modern machine shop

new shop equipment . . .



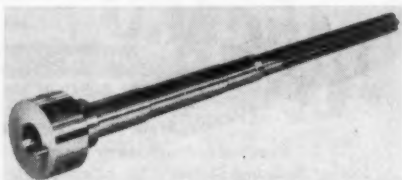
Mohr Tool will cut 18 different thread sizes

the dies remain in the holders and are always ready for immediate use; no need for mechanics to waste time looking and mounting die in holder. Each die is secured by three Allen screws, and the face of each die is parallel with the back of the holder, making it simple for mechanics to cut threads on any lathe, drill press or by hand. For more data circle 144 on Postpaid Card

★ modern machine shop ★

REPLACEMENT SPINDLE FOR MILLING MACHINES

A replacement spindle that adapts any Bridgeport Milling Machine for Microbore Flash-Change Tooling has been announced by DeVlieg Microbore Division, DeVlieg Machine Co., 2720 West Fourteen Mile Rd., Royal Oak,



DeVlieg Microbore Replacement Spindle

June, 1958

Michigan. Flash-Change is the Microbore quick-change tooling system that reduces down time on milling, drilling and boring operations and, thus, increases productivity.

The Microbore replacement spindle is easily installed. The Flash-Change Socket, which is an integral part of the spindle, combines maximum strength and rigidity for roughing operations with extreme accuracy for precise finishing operations.

In addition to the spindle, a full range of standard Flash-Change Adapters for end mills, shell end mills, drills, drill chucks and one or two tool Standard Microbore Boring Bars is also available.

For more data circle 145 on Postpaid Card

★ modern machine shop ★

SMALL SIZE CENTER DRILLS

Two smaller sizes of center drills (with countersinks) are now available as stock items from Woodruff and Stokes Co., Inc., Bldg. 32, 357 Lincoln St., Hingham, Mass. These center drills, sizes 0 and 00, are manufactured in stock sizes.

Numerical sizes, as established in 1953 by tool manufacturers for all combined drills and countersinks, were designated down to No. 1. This range of sizes proved adequate for most uses until the increased need for very small components in the fields of electronics, missile instrumentation and scientific research necessitated excessive and costly special tooling of smaller center drills.

To meet the small tool demand, Woodruff and Stokes produce stock quantities of precise, durable center drills in 0 and 00 sizes. The W and S No. 0 Center Drill has a drill diameter of 1/32 inch, a drill length of 1/16 inch, a body diameter of 1/4 inch and measures 1 1/4 inches long. The W and

NEW LOW COST LEAD SCREW TAPPER



with...
**PUSH
BUTTON**
operating
control

- Produces Gauge Perfect Parts.
- Eliminates parts spoilage, inspection.
- Saves Taps, Reduces Fixture Costs.
- Fast, Economical, 6-way Operating Action.

Here is truly the most accurate, most precise, cost-cutting tapper! New, different, flexible, it can be operated with push button and foot control for cycle or jog, automatic or with switch in fixture for cycle and jog. Either way, it provides a uniformity, speed and precision accuracy that's unparalleled!

EASY TO OPERATE—PAYS FOR ITSELF

Push button releases electrically controlled air pressure engaging sensitive friction clutch which actuates lead screw. The tap, completely controlled by lead screw, is fed gently, automatically without pressure. The result is repetitive uniformity and precision that never varies! Tests proved all tapped parts passed 100% inspection—without rejects!

Write for FREE Brochure for complete details!

PROCUNIER
SAFETY CHUCK CO.
12 SOUTH CLINTON STREET
CHICAGO, ILLINOIS
DEPT. 6

For more data circle 539 on Postpaid Card

modern machine shop 257

STEP UP PRODUCTION 20% +

... for most lathes to 1" bar stock cap.

- Hold delicate parts without damage or adjustment
- Iron grip for heavy work
- No adjusting for stock or part variations
- Finger-tip or foot control eliminates operator fatigue
- Eliminates jarring of head stock



(Ten day FREE TRIAL to reliable firms)

WILSON AIR COLLET CLOSER, INC.
909 40th Ave. NE, Minneapolis 21, Minn.

For more data circle 540 on Postpaid Card

REDUCE TOOL GRINDING TIME



PRE-GROUND COMBINATION

Right & Left Hand

TOOL BIT COBALT STEEL

Grind tool end only ... Lasts longer ... Hollow ground

Trial bit, 3/8" sq. x 3", only \$1.75 postpaid

Available all sizes ... prices on request ... quantity discounts

TOOL-CRAFT CO., Dept. M-7,
COUDERSPORT, PA.

For more data circle 541 on Postpaid Card



Best Economy for Light-Duty Stamping Jobs

- Wedge-Grip design for deep, clear impressions
- Quick type-change feature

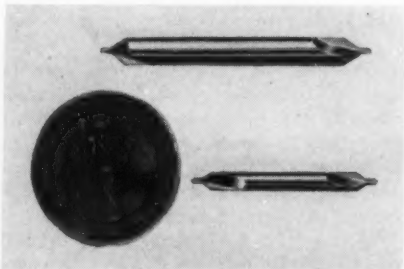
Outfits include from 80 to 154 pieces of type—plus a holder made from non-spalling, non-mushrooming Mecco Safety steel. Write for Bulletin UT.

Mecco
SAFETY UTILITY MARKING OUTFIT
A product of the Marking Device Industry
M. E. CUNNINGHAM CO.

1051 CHATEAU STREET, PITTSBURGH 33, PA.
For more data circle 542 on Postpaid Card

258 modern machine shop

new shop equipment . . .



Woodruff and Stokes Center Drills

S No. 00 has a drill diameter of 0.025 inch, a drill length of 3/64 inch, a body diameter of 5/64 inch and is 7/8 inch long.

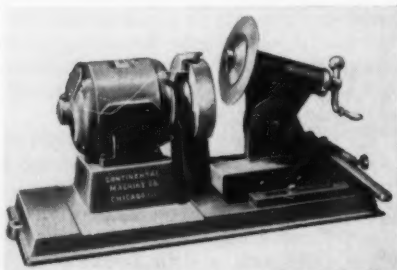
For more data circle 146 on Postpaid Card

★ modern machine shop ★

PIPE AND TUBE ROTARY CUT-OFF WHEEL GRINDER

A bench model grinder, designed especially for sharpening pipe and tube rotary cut-off wheels, has been announced by Continental Machine Co., 2345 West Nelson St., Chicago 18, Illinois.

Plants sending wheels of this type outside for resharpening can now ef-



Continental Rotary Wheel Cut-Off Grinder

June, 1958

fect savings by doing their own re-grinding. The manufacturer states that the machine grinds wheels to original factory sharpness and pays for itself over makeshift methods.

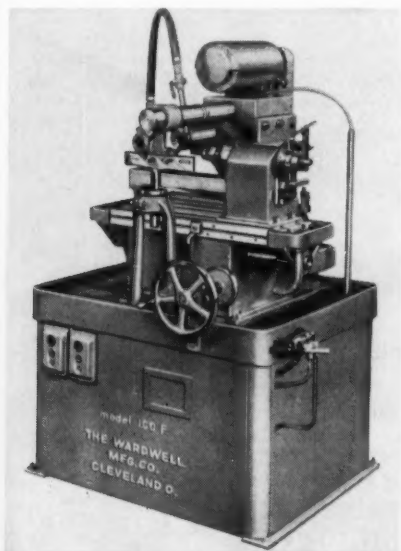
It has a manual bevel adjustment and set screw stop that permit exactly equal length bevels on both sides of the blade. The adjustable base compensates for grinding wheel wear. It sharpens 4½ to 8 inch wheels. An adapter is available for wheels smaller than 4½ inch diameters.

For more data circle 147 on Postpaid Card

★ modern machine shop ★

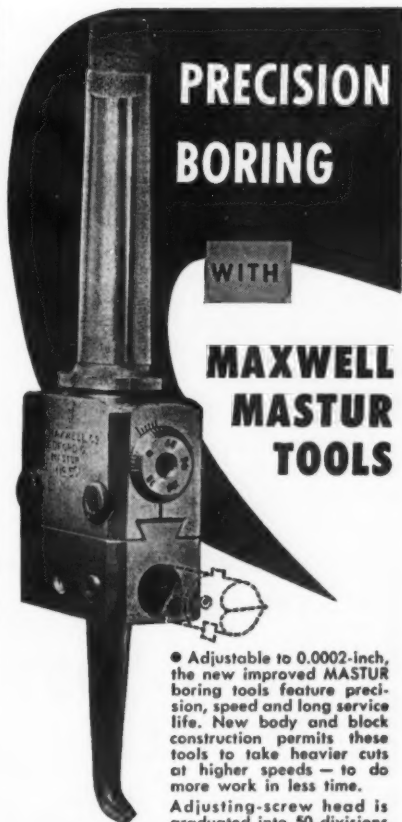
AUTOMATIC SAW TOOTH MILLING AND GRINDING MACHINE

A versatile, automatic saw tooth milling and grinding machine has been announced by The Wardwell Manufacturing Co., 3803 Ridge Rd., Cleve-



Wardwell No. 100F Automatic Machine

June, 1958



• Adjustable to 0.0002-inch, the new improved MASTUR boring tools feature precision, speed and long service life. New body and block construction permits these tools to take heavier cuts at higher speeds — to do more work in less time.

Adjusting-screw head is graduated into 50 divisions to provide readings in thousandths, and body is graduated to permit vernier readings of 0.0002-inch. The three models available have maximum boring bar capacities of 1/2, 3/4 and 1-inch and boring range from 3/8 to 15 inches.

1955-MC



Write for
catalog.

THE MAXWELL COMPANY

400 E. Fifth Street, Ashtabula, Ohio

For more data circle 543 on Postpaid Card

modern machine shop 259

new shop equipment . . .

land 9, Ohio. Designated as the Wardwell No. 100F Automatic Machine, this hydraulically operated equipment is said to perform the following multiple operations: milling form milling cutters; milling slitting and screw slotting saws; grinding saws; milling straight flutes in tools such as taps and reamers; and milling or grinding other special dividing head work.

Designed to perform these operations in gangs at one setting, the Wardwell No. 100F Machine automatically indexes a gang of saws, one row of teeth at a time.

This machine mills saws up to 14 inches in diameter and in gangs up to 7 inches long (it will take 112 saws 1/16 inch thick, in one setting).

For more data circle 148 on Postpaid Card

WORKTABLE SPEEDS DRILLING AND BORING WORK

A heavy duty worktable for radial drilling, tapping and boring, incorporating the means for both angular and radial positioning of workpieces, has been announced by Galger Engineering and Manufacturing Co., Rockford, Ill. In addition to providing 360 degree rotation and eight equally spaced radial locating holes, the cradle type design of the Galger Table permits tilting work in a number of different planes, from horizontal to vertical. This makes it possible to perform an almost unlimited number of machining operations on a wide range of work.

This "Tilt-A-Turn" Table is unusually simple, but sturdy, in design. It consists of a heavy saddle equipped with sturdy 3 inch pivot pins mounted in precision ball bearings, a semi-steel cradle equipped with precision bored,

SUPER LOW-COST CUTTING

**CUT PIPES AND TUBES
FAST -- THE SUPER-SPEED
ROTARY WAY**

CONTINENTAL ROTARY CUT-OFF MACHINES

fast—cut lengths in just seconds
economical—up to 100,000 cuts per cut-off wheel
saving—no waste loss of your material

Continental

SINCE 1919

machine co.

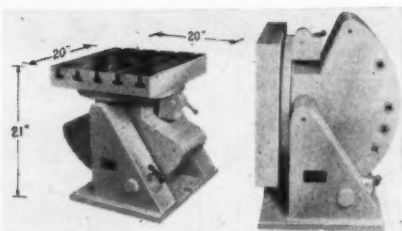
2345 W. NELSON ST.

CHICAGO 18, ILL.

For more data circle 544 on Postpaid Card



*Air or manual,
3/8" to 12 3/4" O.D.
Catalog.*



Galger "Tilt-A-Turn" Heavy Duty Work Table

hardened steel insert locating holes and a standard precision ground tee slot table. The standard table is 20 inches square by 3 inches thick. The table is supported by a $2\frac{3}{4}$ by 10 inch precision ground pin, mounted in two large, opposed precision bearings, assuring easy rotation and accurate parallelism. The underside of table has eight equally spaced precision bored positioning holes for radial location.

The table and cradle are accurately located in angular and radial positions by means of spring loaded, hardened steel indexing pins which are lever operated through rack and pinion gears. The cradle is equipped with a removable

cover and inside bosses, which carry counterweights. Extra space is provided for additional counterweights as may be required to suit specific work.

The opposite side of the saddle housing is also equipped with an auxiliary friction type locking pin, which is lever operated in the same manner as the indexing pins. This type of arrangement permits positioning the work table at any intermediate plane desired.

For more data circle 149 on Postpaid Card



Adjustable Chucks are available as Duplex, Taper Base or Swivel Base, in work surface sizes from 4" x 8" to 10 $\frac{1}{4}$ " x 60".

See how easy it is to set up a formed cutting tool on a Taft-Peirce Duplex Base Chuck to grind a compound angle.

Taft-Peirce Adjustable Chucks Save Setup Time, Make Angle Grinding Easy

Speed, precision and simplicity go hand-in-hand when you use Taft-Peirce Adjustable Chucks for tough angular setups.

Superpower Duplex Chucks are a real time saver for grinding simple or compound angles, milling and grinding formed cutting tools, and dressing carbide tipped or steel single point tools. Swivels to 90 degrees either side of horizontal, tilts to 14 degrees, clamps rigidly at any setting.

Complete line of Magnetic Chucks from one source — Taft-Peirce. These are but a few of the great variety of standard and special chucks — both permanent and electro-magnetic — which you can get from Taft-Peirce. Send for Catalog 412, and try one of these in your shop, now.

TAKE IT TO

TAFT-PEIRCE



WOONSOCKET, RHODE ISLAND

For more data circle 545 on Postpaid Card

new shop equipment . . .

AUTOMATIC DIE HANDLER AND OPERATOR LIFT

Model WWL-120 Walkie-Worklifter, manufactured by the Economy Engineering Co., 4507 West Lake St., Chicago 24, Ill., provides automatized



**PACE TAPER ROLLER BEARING
LIVE
CENTERS**

ACCURACY
± .0001" TIR
RIGIDITY

Preloaded with
two Precision Matched Timken
or Bower Taper Roller Bearings

**For . . . GRINDING
PRECISION TURNING
HEAVY-DUTY
OPERATIONS**

Write to:
PACE ENGINEERING COMPANY
1507-B E. Michigan St., Indianapolis, Ind.

For more data circle 546 on Postpaid Card

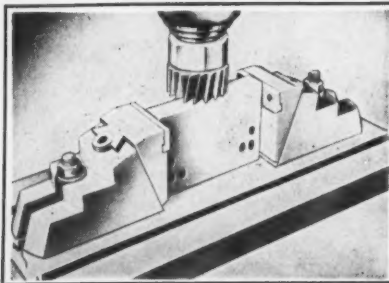


Economy Model WWL-120 Walkie-Worklifter

die handling and storage. The battery powered unit elevates dies and operator, in addition to transporting. The articulated operator's platform is picked up by the load platform as it rises, enabling the operator to work at die level at shelf heights up to 10 feet. Lift action is hydraulic and controlled from the operator's platform. A roller frame on the load platform facilitates smooth die transference.

The unit has a 2,000 pound capacity and comes complete with a 12 volt, 205 A/H diesel type battery and 20 amp. charger.

For more data circle 150 on Postpaid Card



MASTER GRIPPING CLAWS System Hubner

WHY use them?

1. Clamping action Vertical as well as Horizontal — pressing workpiece down directly on the machine table. No hammering — no air between. 2. Gain more working room. 3. Faster and more secure setups. Easier to handle. 4. Unlimited jaw opening. 5. No straps overlapping on the workpiece; more machining surface. 6. Extremely versatile—take light cuts or heavy cuts, use on small machines or heaviest production machines.

Exclusive Agents

KARL A. NEISE
404 4th Ave., Dept. MMS,
New York 16, N. Y.

**NEISE
MODERN TOOLS**

For more data circle 547 on Postpaid Card

PN

G
Bell
desi
stan
plat
ly a
the
so c
both
are
rang
metr
dial,
mach
ly c
a le
hand
Fifty
ters
can

TH
erate
single
cycl
and
of a
poun
press
ed fr
line,
taine
regul
select
sure
conve



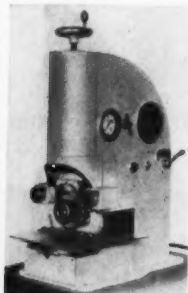
Schmidt

June,

PNEUMATIC PLATE STAMPER

George T. Schmidt, Inc., 1806 West Belle Plaine Ave., Chicago 13, Ill., has designed and built a pneumatic plate stamper which guarantees that nameplates will be marked accurately, safely and with no fatigue on the part of the operator. The machine has been so designed as to require the use of both hands to cycle the unit, so fingers are never in danger. The switch arrangement is symmetrical about the dial, so that the machine is equally convenient for a left or right handed operator. Fifty to 60 characters per minute can be stamped.

The unit operates on 110 volt, single phase, 60 cycle electricity and shop air line of at least 40 pounds. Stamping pressure is derived from the air line, and self-contained pressure regulator allows selection of pressure desired. A convenient knob



Schmidt Plate Stamper

in the front of the table permits setting the table at the desired starting position.

The Schmidt Pneumatic Plate Stamper will mark plates of varying hardness from soft brass to stainless steel. It will accommodate plates up to 6 by 8 inches from 0.012 to 0.062 inch thick. (Plates up to 1/2 inch thick can be accommodated with special table and special gage.)

For more data circle 151 on Postpaid Card

BIG • FAST • ECONOMICAL



model J

HEAVY DUTY BAND SAW
(WET OR DRY)

FEATURES

Large Capacity
Semi-Portability
Versatility
3-point Suspension
Operational Safety
Centralized Controls
Speed—Accuracy
Lowest Cost

- The finest metal cutting band saw available
- ... and at the lowest price. The big, rugged
- Johnson Model J easily handles 10" rounds,
- 18" flats—automatically. A brute for work,
- the versatile Model J is available in stand-
- ard wet or dry models. See for yourself how
- much time, labor and money you can save
- with a Johnson saw.



MANUFACTURING
CORPORATION

1011 Barnes Street
Albion, Michigan

For more data circle 548 on Postpaid Card

new shop equipment . . .

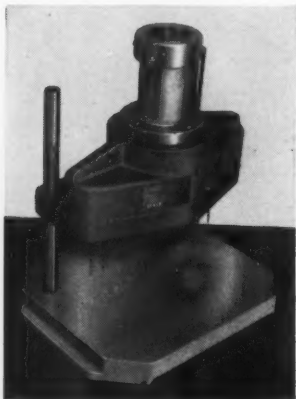
MOLD SPOTTING PRESS

Palfy Die and Mold Co., 2900 Bradwell Ave., Cleveland 9, Ohio, has announced the Bradwell Spotting Press. Now one man with little effort can open and close a heavy die and save his energy for the more important work of fitting. The parallel closing of

the die makes it easy to fit dies and insures more accuracy. The great safety feature in this design is that the ram is lifted up for spotting and, when working on the die, the ram is in down position.

With the dust protected ways, no time is lost covering and wiping off ways from emery grinding. The narrow width of the press makes it easy to work without leaning in too far.

FOR STRAIGHT-LINE
DRILLING, REAMING, TAPPING,



Spindles Can Be Spread
In An Area of This Shape

Use

Zagar's

IN-LINE HEAD

**Designed specifically for
long, narrow hole patterns!**

All Zagar advantages are included in the IN-LINE head. Any number of holes, in any pattern, on all centers within the area, can be drilled, tapped or reamed simultaneously in any material. Spindle diameters $\frac{1}{4}$ " through 1". IN-LINE heads can be mounted on any standard drill press. You'll get full engineering data when you —

Write for Bulletin S-906

ZAGAR, INCORPORATED, 23898 Lakeland Blvd., Cleveland 23, Ohio

Zagar

**TOOLS FOR INDUSTRY
and SPECIAL MACHINERY**

For more data circle 549 on Postpaid Card



For m

ST



Shims
for re
tain s

ALSC

For m

Wgt.



BAR
500 G

For mor

June,



NEW NESTING TYPE

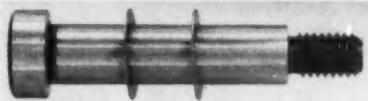
TOTE PANS

Sturdy 16 ga. metal.
20" long x 12" wide
x 6 1/4" deep. Drag
holes and handles at
both ends.

J. L. LUCAS & SON, INC.
Bridgeport 5, Conn.

For more data circle 550 on Postpaid Card

STRIPPER BOLT SHIMS



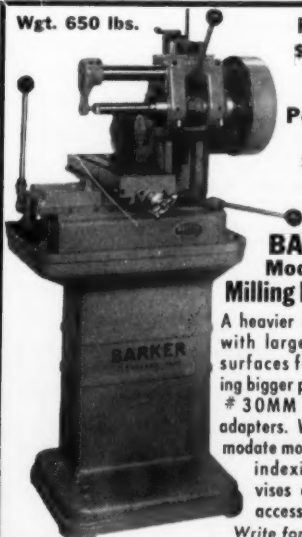
Shims fit standard bolts and eliminate the need
for re-counterboring or turning of bolts to main-
tain stripper height when sharpening dies.

Write for complete details.

ALSCO CO., 1770 Stone Rd., Rochester, N. Y.

For more data circle 551 on Postpaid Card

Wgt. 650 lbs.



PRICE
\$695⁰⁰

**Cast
Pedestal
Base**
\$95⁰⁰
3/4 H.P.

BARKER Model A-M Milling Machine

A heavier Barker Mill
with larger working
surfaces for machin-
ing bigger parts. Takes
30MM standard
adapters. Will accom-
modate most standard
indexing heads,
vises and special
accessories.

Write for Literature

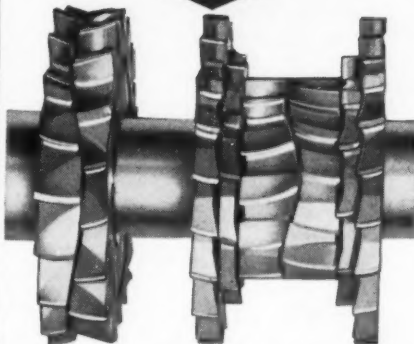
BARKER ENGINEERING CO.
500 Green Rd. Cleveland 21, Ohio

For more data circle 552 on Postpaid Card

June, 1958

ABER Curved Tooth

**MULTIPLE
CUTTERS**



By using the wide range of Standard
ABER CUTTERS for gang milling...
fast accurate cuts on any number
of surfaces simultaneously.

ABER Engineering service will design
and make the unit exactly suited
to your job... send blueprints and
specify material to be cut.

ABER Curved Tooth PLUS FEATURES

1. Longer production runs
2. More accurate control of limits and finish
3. Elimination of chatter

4. Faster heat dissipation
5. Shearing action

FREE DATA —

24 page catalog
on milling with
ABER Cutters.



**ABER ENGINEERING
WORKS**

WATERFORD, WISCONSIN

For more data circle 553 on Postpaid Card

modern machine shop 265

**CMD
LEADER
PIN
LUBE**



PROTECTS -

- LEADER PINS
- GUIDE POSTS



OFFERS -

1. GREATER OILINESS
2. MORE ADHESIVENESS
3. HIGHER FILM STRENGTH

PREVENTS -

- WEAR
- SCORING
- GALLING
- FREEZING

TEST RESULTS

1 3/4" Pin Size .001" — .005" Fit Tolerance
312 Strokes Per Minute.

One normal application was made of CMD LEADER PIN LUBE and test was made to destruction. *More than 2,500,000 strokes recorded before pin seized for lack of lubrication.*

TRIAL OFFER

These kind of results prove CMD LEADER PIN LUBE gives EXTRA lubrication . . . adds a SAFETY MARGIN.

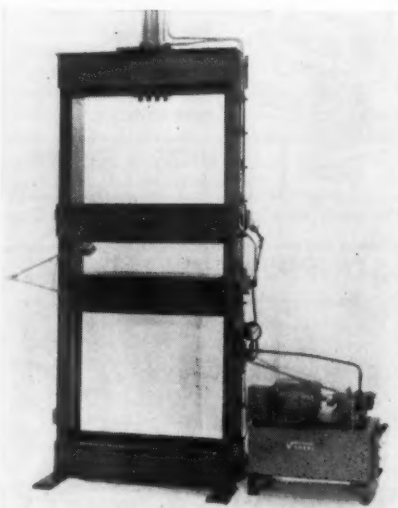
Ask for a TRIAL ORDER of a 1 lb. can for your use. Furnish complete information on your purchase order or letter. Sent prepaid at a cost of \$1.00.

Leader Pin Lube
**CHICAGO MANUFACTURING
AND DISTRIBUTING CO.**

1910 West 46th Street, Chicago 9, Illinois
For more data circle 554 on Postpaid Card

266 modern machine shop

new shop equipment . . .



Bradwell Spotting Press has 10 ton lift

The generous daylight space of approximately 50 inches gives ample head room. The 75 inch length of the ram gives rigidity, insuring parallel movement.

For more data circle 152 on Postpaid Card

★ modern machine shop ★

DETACHABLE BAND SAW

Davies Product Engineering Co., Box 216, Fraser, Mich., has announce-

**ALSCO Self-Locking Tool
and Die Makers' Springs**



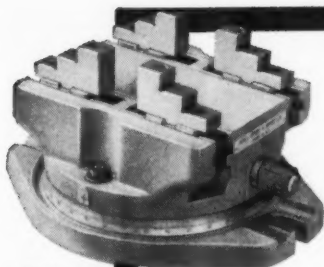
• Made in four lengths from 1" to 2 3/4" and eight thicknesses from .010 to .032. Low cost, handy, neat looking.

Write for details.

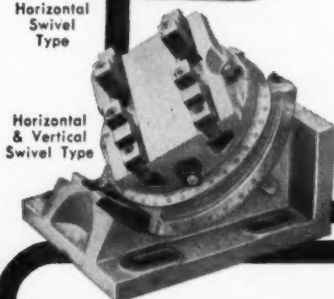
ALSCO CO., 1770 Stone Rd., Rochester, N. Y.

For more data circle 585 on Postpaid Card

June, 1958



Horizontal
Swivel
Type



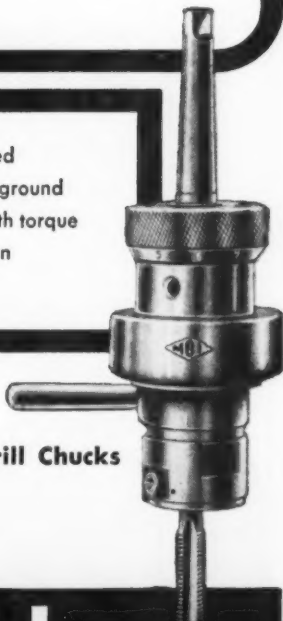
Horizontal
& Vertical
Swivel Type

Multi-Purpose Vises

4 STEPPED JAWS PERMIT CLAMPING of rough castings, irregularly shaped, round, and tapered pieces accurately and quickly, eliminating need for special jigs or fixtures. Narrow stepped jaws allow free access to and measuring of work pieces and provide clearance for cutting tools. Small work pieces machined on three sides without reclamping. Rigid in any position. Various capacities and extra soft jaws available.

Reversible Safety Tapping Attachments

with adjustable graduated friction drive, hardened, ground and lapped, complete with torque bar and handles. Precision made throughout.



Tested for Performance to American Standards

ALSO AVAILABLE:

- Dial Vernier Calipers • Keyless Drill Chucks
- Quick Change Chucks & Collets

Immediate Delivery From N.Y. Stock.

DISTRIBUTOR INQUIRIES INVITED



Write for
Descriptive Booklet
and prices.

Our Headquarters
in New York City



M.B.I. export & import Ltd.

A Division of Machinery Builders Inc.

475 GRAND CONCOURSE, BRONX 51, NEW YORK
Phone: MOtt Haven 5-0900

"Over 25 years experience in designing and building machinery"

For more data circle 555 on Postpaid Card

new shop equipment . . .

ed a new development in band saw blades which makes it possible to do internal sawing without having to cut, weld and grind the band. The band can be securely joined or taken apart in seconds without any damage. The dovetail notches interlock in order to take the longitudinal tension. The holes where the ends join have inter-

nal vee grooves and the ends are locked in place by inserting soft metal balls into the holes and flattening them to the band thickness with pliers, thus causing them to expand and fill the vee grooves. According to the manufacturer, no sizing of the band thickness is necessary.

All teeth and the entire band retain the original hardness and temper. The alignment is always perfect, assuring that the band passes smoothly through the

guides.

By the use of this band saw, which can be quickly joined or separated, the rapid band sawing method of metal cutting becomes practical for sawing within an opening in a workpiece even when the operation performed is of short duration. For more data circle 153 on Postpaid Card

ARROW TOOL & REAMER CO. • Established 1916



Arrow
means a complete
LINE OF END MILLS

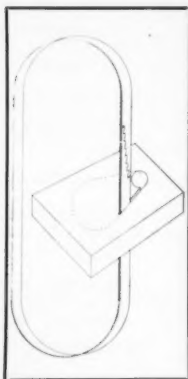
**THIS IS
Arrow's
3
FLUTE
END MILL**

**Manufacturing skill
and tool making experience
for over 37
years — adds up to
preference for Arrow
End Mills.**

ARROW TOOL & REAMER CO.

711 Stephenson Highway
P. O. Box 338 • Troy, Michigan

For more data circle 556 on Postpaid Card



Drawing shows
Davies Detachable
Band Saw Blade



*Production
with
precision*



GUARANTEED ACCURACY 0.00015"

**...attained with the New
SIP HYDROPTIC 6A Jig Boring and Milling Machine**

Due to unprecedented cutting ability . . . increased range and capacity . . . simplification of controls . . . and ease of operation, the HYDROPTIC 6A is unmatched in performance.

Up to **30% increase** in productivity has been realized with the AUTOMATIC COORDINATE REPEATING DEVICE DIR (optional equipment) which repeats successively the initial settings made during the machining of the first workpiece.



*As with all SIP HYDROPTICS, accuracy is based on SIP High Precision STANDARD SCALES.
For complete information, send for Catalog No. 1149.*

AMERICAN SIP CORPORATION • 100 EAST 42 ST., NEW YORK 17, N.Y.

For more data circle 557 on Postpaid Card

June, 1958

modern machine shop 269

NOW...

**DIAL YOUR
CORRECT
DRILL SPEED**



**Exclusive
drill
size—
material
chart
provides
INSTANT
SPINDLE
SPEED
SELECTION
150
TO
4000
R. P. M.**

5/8" Capacity Precision-built for Tool Room, Model Shop, Experimental Laboratory and Accurate Production Work.

FEATURES GEARED OR DIRECT SPINDLE DRIVE • INSTANT SET QUILL • DEPTH STOP • BUILT-IN MOTOR • HEAVY CONSTRUCTION TO MAINTAIN ACCURACY • SPECIAL SLOW SPEED HELICAL BACK GEARS.

Free Descriptive Bulletin

The ELECTRO-MECHANO CO.
265 E. Erie St. Milwaukee 2, Wis.

For more data circle 558 on Postpaid Card
270 modern machine shop

**INVESTIGATE
GISHOLT
FACTORY-REBUILT
MACHINES**

NEW MACHINE GUARANTEE

phone or write for quotations
and details

GISHOLT
MACHINE COMPANY

1219 E. Washington Ave., Madison 10, Wis.

Phone: Alpine 6-9081, Ext. 222

For more data circle 559 on Postpaid Card

**PREIS-PANTO SINGLE-LIP ENGRAVING
cutters**



STRAIGHT
AND TAPERED
SHANK CUTTERS
IN H.S. STEEL
TUNGSTEN CARBIDE
DIAMOND TIPPED
AND DIAMOND DRAG
MARKING



CUTTER GRINDER
for sharpening your
engraving cutters

are now
available in
improved design
at new low prices
All single lip cutters
are furnished unsharpened or sharpened
to any shape or angle
required
Unsharpened cutters stocked for
quick delivery

See Preis first for complete line
of quality engraving machines
and accessories

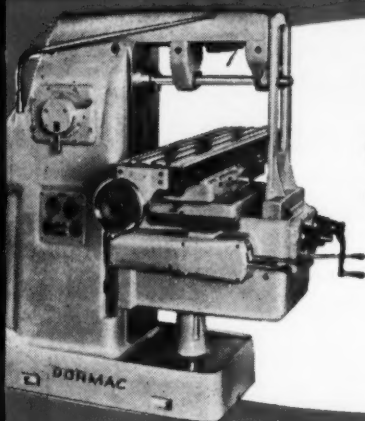


H. P. PREIS ENGRAVING MACHINE CO.

657 U. S. ROUTE 22, HILLSIDE, NEW JERSEY

For more data circle 560 on Postpaid Card

June, 1958



DORMAC • MILL-MATIC
DIAL TYPE • HIGH SPEED
1200 rpm Universal Milling Machines

ACCURATE • DURABLE • EASY TO OPERATE

National standard taper Power feed in all directions. Hardened and ground gears. Power rapid traverse.

MILL-MATIC 48" x 11" Table\$4390.

DORMAC 60" x 12" Table\$5350.

Standard equipment included.

WOTAN

HIGH PRECISION
3³/₈" BORING MILL
for Toolroom and Production

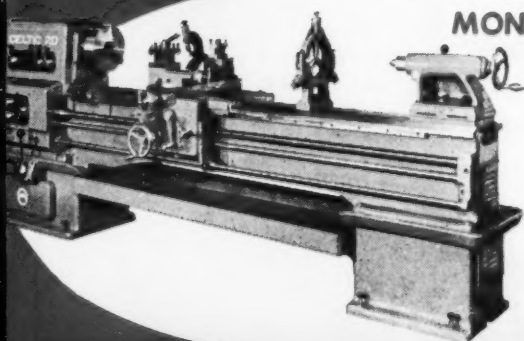
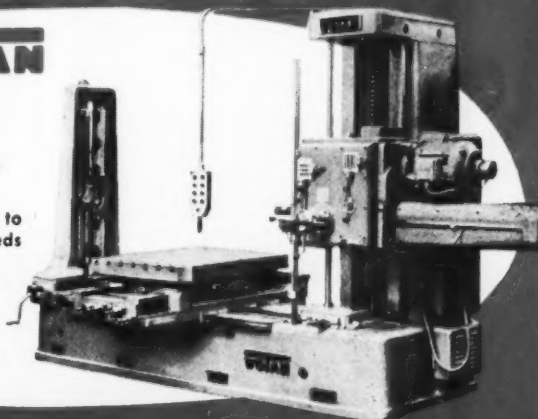
CAPACITY:

Vertical Capacity 36", Distance Spindle to Outboard Support 86", M.T. #5, Speeds up to 1000 RPM.

OTHER SIZES ARE BUILT IN:

4³/₈" and 5¹/₈"

Table & Floor Type Models



MONDIALE **CELTIC**

PRECISION LATHES

CELTIC 20" LATHE

MADE IN 12"-14"-17"-20" SWINGS

QUALITY • PRECISION

DEPENDABILITY

WRITE FOR FULLY ILLUSTRATED BROCHURES

DEALER INQUIRIES INVITED

INDEX INDUSTRIAL CORPORATION

150-MM BROADWAY • NEW YORK 38, N. Y. • BEekman 3-4540

LOWEST PRICES

Diamond Wheel Dressers

Guaranteed to be full, individual stones, mounted in 7/16 x 6" cold rolled shanks

Carat	Price
1/4—	\$ 2.25
1/2—	4.00
3/4—	6.00
1 —	8.25
1 1/2—	12.00
2 —	16.00



★ These diamonds can be set in any shank to your specification for \$1.00 each extra.

★ Prompt resetting service

Allstate Diamond Products, Inc.

Manufacturers of a complete line of diamond tools and wheels

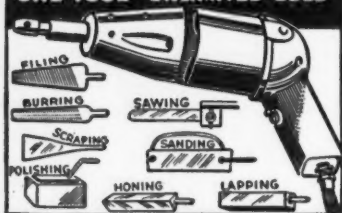
245 W. 27th St., Dept. F, New York 1, N. Y.
CHickering 4-7725

★ Dealers' inquiries invited

For more data circle 562 on Postpaid Card

STOP... HAND WORK

ONE TOOL - UNLIMITED USES



Use these Handy PORTABLE ELECTRIC RECIPROCATING TOOLS for Greater Production, Better, More Uniform Work — All with less Operator Fatigue. Fixed strokes are 1/8" or 3/8" long. Operate on 110 Volts AC-DC. Deliver 1000 PUSH-PULL strokes per minute. Try one of these tools on your next job.

Send for Descriptive Literature.

ACME TOOL CORP.

73 W. Broadway • New York 7, N. Y.

For more data circle 563 on Postpaid Card

Leitz

New SIMPLEX TOOLMAKERS MICROSCOPE

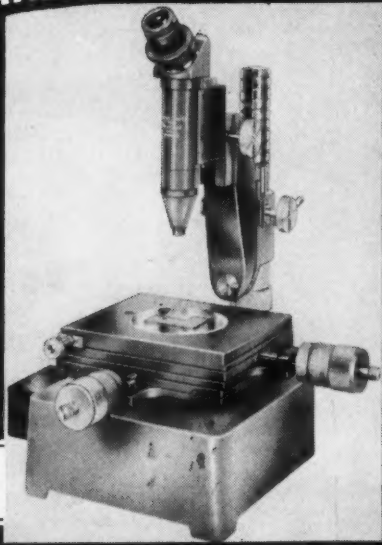
YOU GET

A COMPLETE TOOLMAKER MICROSCOPE of 2" x 2" range in .0001" at a basic price of \$1150. Compare this outstanding value.

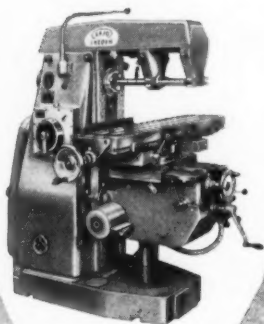
Request catalog 81/155

OPTO-METRIC TOOLS, INC.

137MM VARICK STREET • NEW YORK 13, N. Y.



For more data circle 564 on Postpaid Card



SAJO Horizontal
Miller Model 54

Time stood still...

We can't turn back the calendar, but—
you can buy SAJO Millers today at the same price
you paid for a comparable machine tool in 1949.

Produced by Sweden's master craftsmen, these modern machine tools are engineered to maintain precise tolerances in continuous heavy-duty production. An example is the unique SAJO spindle construction employing SKF precision 2-row staggered roller bearings followed by thrust ball bearings, providing better load distribution and silent, vibration-free operation.

Built to U. S. standards, SAJO Millers are recognized for their accuracy, dependability and long life.

Condensed specifications:

table 52" x 11"
longitudinal movement 33½"
16 spindle speeds, 39-1500 r.p.m.
American Standard Taper No. 50
main drive motor 7½ h.p.
feed motor 1½ h.p.

Accessories:

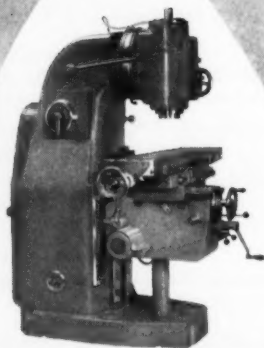
Universal Dividing Head, Rotary Index Table, Vertical and Universal Milling Attachments, Slotting Attachment, Vises, Arbors.

Also available:

SAJO Plain and Universal Millers, table size 41½" x 9¼".

Here are "hindsight" opportunities for
foresighted machine tool buyers.

Write for literature and references in your area.



SAJO Vertical
Miller Model 54

austin
industrial
corporation

76-H Mamaroneck Avenue, White Plains, N. Y.

HORIZONTAL AND VERTICAL SHAPERS—POWER HACKSAWS
Fast Service and Parts Available from Major Cities

For more data circle 565 on Postpaid Card

REDUCE Set-up Time and the
need for expensive jigs & fixtures

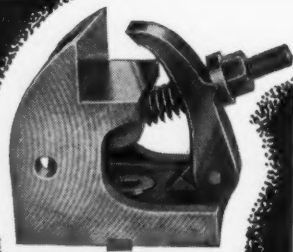
HART MILLING FIXTURES

"Masters of A Thousand Set-ups"

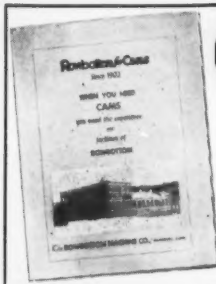
Write for
illustrated
Folder

Value proved by years of use.

WALTER W. FIELD & SON, INC.
39 Hayward St., Cambridge 42, Mass.



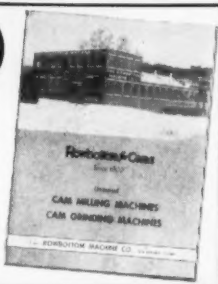
For more data circle 566 on Postpaid Card



Send today for these **NEW Brochures**
FREE on REQUEST

All about CAMS and how to make them

The Rowbottom Machine Co.,
P. O. Box 4097, Waterbury, Conn.

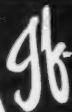


For more data circle 567 on Postpaid Card

**TYPES TO FIT
ANY MACHINE
USED FOR
TAPPING
OR
REAMING**



**PROMPT
DELIVERY**



**YOU'RE WORRIED
OVER SPOILAGE LOSSES -**

On tapping and reaming jobs, many have found that all they had to do practically to eliminate their spoilage losses was to switch over from ordinary tool holders to Ziegler Floating Holders.

They found that the Ziegler automatically compensated not only for misalignment caused by faulty set-up but also for misalignment resulting from the machine getting out of level because of settling, whether caused by soil formation, or by machine vibration, or both.

Isn't this a simple way to solve your problem of costly spoilage losses? Try it and see for yourself!

W. M. ZIEGLER TOOL CO.

roller drive floating tool-holders

13566 Auburn

• Detroit 23, Michigan

For more data circle 568 on Postpaid Card

**NEW BARER-MEUSER
HIGHEST PRECISION
HIGHEST PERFORMANCE**

MO Lathes

★ **8 SPINDLE SPEEDS,**

forward and reverse,
24-900 or 42-1600 r.p.m.

★ **WIDEST THREADING RANGE**
(without change gears)

96 American threads,
from $\frac{27}{64}$ — 128 t.p.i.

64 Metric threads,
from 0.375 — 64 m.m.

86 Diametral pitch threads,
from 1—160 threads/ π inch.

32 Module threads,
from 0.25 — 16 module.

★ **REGULAR FEEDS:**

42 longitudinal feeds
.0006" — .0248"

42 cross feeds .0002" — .0075"

★ **COARSE FEEDS:**

42 longitudinal feeds
.0048" — .1984"

42 cross feeds .0016" — .0600"

IMMEDIATE DELIVERY

from our New York warehouse!

FREE installation and service coast to coast!



Prices are F.O.B.
New York or Los Angeles,
American duty included.

14" SWING (21" IN GAP)

Swing	Centers	Net Wt.	Price
14"	30"	2800 lbs.	\$2,950.00
14"	40"	3000 lbs.	3,100.00
14"	60"	3200 lbs.	3,350.00
14"	80"	3400 lbs.	3,500.00

16" SWING (23" IN GAP)

Swing	Centers	Net Wt.	Price
16"	30"	3000 lbs.	\$3,200.00
16"	40"	3200 lbs.	3,400.00
16"	60"	3400 lbs.	3,650.00
16"	80"	3700 lbs.	3,950.00

Prices include 3 or 4 H.P. motor and standard accessories.

AS SEEN AT THE ASTE TOOL SHOW IN PHILADELPHIA, MAY 1 - 8

BARER ENGINEERING & MACHINERY COMPANY LTD.

Champlain, New York

Phone: AXminster 8-3811

P.O. Box 1180, Montreal 3, Canada

Phone: Wellington 7-3911-2-3

For more data circle 569 on Postpaid Card

NEW



5" Hinged Sine Plate

features

6 1/4" x 6 1/4"

WORKING SURFACE

with 3 T slots

No. 1806
\$195.00 with oak case

Positive locking provides rigid set-up for light machining operations. .2000" recess in base makes small angle set-ups easy. Precision ground base and body and hardened rolls insure accuracy. Heavy end and side plates. A precision tool at LOW COST.

No.	Cent. Dist.	Width	Price W/ Case
1805	5"	3"	\$109.50
1806	5"	6 1/4"	195.00
1810	10"	5"	265.00



F.O.B. St. Paul. Order your sine bar or sine plate from the complete Bald Eagle line starting at \$21.75 from your dealer or direct.

BALD EAGLE PRODUCTS DIV.

Bald Eagle Corporation

356 Cedar Street, St. Paul 1, Minnesota

For more data circle 570 on Postpaid Card

CUT TOOL COSTS

broken tools made like new again with **NU-TANGS**

Twisted or broken tools replaced at low costs on any tool with a Morse Taper (sizes 1 to 6). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

NO WELDING! NO SLEEVES! NO SHORTENING! NO DISTORTION!

Send them to us like this! **GUARANTEED STRONG AS NEW!** We return them like this!

Patent No. 2,512,000 **NU-TANGS INC.** 1339 Bates Avenue Cincinnati 25, Ohio

For more data circle 571 on Postpaid Card

Universal
"FULL-FLO"
COOLANT NOZZLES
with **AERATOR**

Ask for IPB-Sec. 2A Bulletin

Quality... ALL METAL FLEXIBLE HOSE PRODUCTS

UNIVERSAL METAL HOSE CO.

2113 South Kedzie Avenue, Chicago 23, Illinois

For more data circle 572 on Postpaid Card

Save Time, Money
and Labor with

DURO DRILL PRESSES

Duro Drill Presses are precision units, offering extra capacity, extra features at no extra cost! It is the only line that permits "custom selection" from the largest array of models in the power tool field. The Duro Line includes single and multiple units, in 15 1/2" and 18" sizes, with or without production tables and bases, with optional foot feeds, in bench or floor models. Each unit has sealed-for-life ball bearings, precision bored bearing seats, ground alloy spindles, vibration free head castings, sturdy cast hinged belt and pulley guards; adjustable feed tension, plus many others.

Write for **FREE Power Tool Catalog**

DURO Metal Products Co.

2682 N. Kildare Avenue, Chicago, Illinois

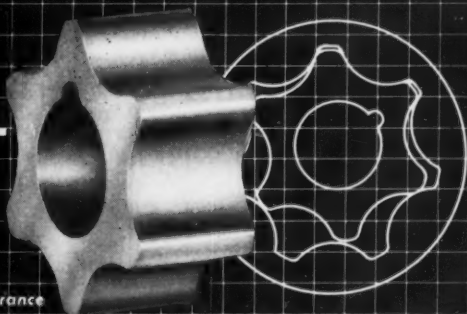
For more data circle 573 on Postpaid Card



68 Models

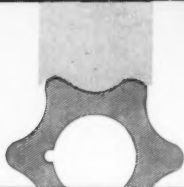
get the right drill press
for the right job at
the right price

hoglund contour dressing...



Six faces ground to .0002" tolerance and 9 microinch finish.

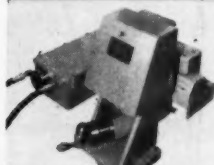
Closer tolerances in pump assembly increase rotor life and efficiency, improve slippage characteristics.



13 stacked impellers are automatically indexed and the form ground in 6 separate positions.



After each impeller stack is ground, wheel is dressed at uniform peripheral speed with diamond normal to surface.



Hoglund Model 38A Dresser features computed master contour template, 10 to 1 inclined plane cam reduction, diamond cooling during dressing.

boosts impeller grinding rates — improves pump performance

This impeller is typical of the countless form grinding applications where the accuracy initiated by Hoglund Contour Dressers enables both product and production improvement.

A Hoglund Model 38A Dresser, installed on a 12x40 surface grinder helped boost production 40%, improved tolerances, and lowered surface finish from 20 to 9 microinches. Combined high accuracy and high production are assured because: a) all Hoglund templates and ratio cams are individually computed to the job; b) only with the simplicity and ingenuity of inclined planes can you sustain accuracy and automaticity.

Over 120 different types of Hoglund Contour Wheel Dressers are now in service — enabling "tenth tolerance" contouring of intricate forms heretofore impossible to grind. They're adaptable to all types of grinders.

If you are grinding simple or intricate forms, you will want the whole Hoglund story in Hoglund's new technical brochure. Let Hoglund engineers recommend a suitable solution to your problem.

HOGLUND

ENGINEERING & MANUFACTURING CO., INC.

371 Snyder Avenue

Berkeley Hts., N. J.

Send for brochure
on solutions to
tough profil-
ing problems.

Name _____ Title _____

Co. _____

Address _____

City _____ Zone _____ State _____

For more data circle 574 on Postpaid Card

where
to
get it

where to get it

Numbers shown are the page numbers of advertisements and new equipment write-ups which appear in this issue.

- Abrasives, Grain, Cloth, Paper, Disc, etc.,** 50, 51, 60, 67, 68b, 68c, 68d, 141
Accumulators, 141
Adapters, 40, 56, 173, 227
Agitators, 287
Air Operated Equipment
 (Look for specific item)
Alloys, 236, 252
Amplifiers, 252
Angle Irons, 243
Angles, 245
Arbors, 33, 40, 243, 273
Automated Equipment
 (Look for specific item)
Bar Machines, Automatic, 52
Bars, Finishing and Roughing, 189, 239
Bases, Index, 220
Bearings, Bronze, 85
Bearings, Roller, 163
Benchs, Inspection, 251
Bending Devices, 212, 247
Bending Machines, 34, 139
Blades, Work Support, 131
Blocks, Riser, 40
Blocks, Sine, 234
Blocks, V, 234
Boosters, 175
Boring Bars, 13, 65
Boring, Drilling and Milling Machines, Horizontal, 184
Boring, Drilling and Tapping Machines, Multiple, 38
Boring Heads, 17, 40, 191
Boring and Milling Machines, 269
Boring Mills, 271
Brakes, Press and Bending, 9, 42, 190, 213, 254
Broaching Machines, 10, 11
Bronze Bars, 85
Brushes, Wire Wheel, 291
Brushing Machines, 291
Bushings, Brass, Bronze, etc., 68, 85
Bushings, Drill Jig, Front Cover, 88, 234, 289
Bushings, Guide Pins, 68
Calipers, 199, 245, 267
Cams, 205, 210, 224, 274
Carbides, 32, 64, 99, 180
Centering Machines, 61
Centers, Index, 210
Centers, Lathe, Planer, Miller, etc., 33, 159, 186, 204, 229, 242, 256, 262
Chamfering Machines, 34
Chucks, Air and Hydraulic, 49
Chucks, Collet, 191, 196
Chucks, Drill, 191, 244, 267
Chucks, Lathe, 49, 244
Chucks, Magnetic, 195, 261
Chucks, Power, 191, 203, 279
Circulators, 287
Clamp Components, 262
Clamps, 33, 63, 195, 281
Cleansers, Hand, 155
Clutches, 233
Coil Handling Equipment, 159, 242
Collectors, Mist, 167
Collet Closers, 258
Collets, 40, 267
Comparators, 77, 199
Compressors, Air and Gas, 90
Conveying Equipment, 249
Coolant Units and Systems, 201, 215, 217
Counterbores, 83, 133, 182
Countersinks, 193, 234
Creams, Industrial, 155
Cut-Off Machines, 44, 224, 258, 260
Cutter Sharpening Machines, 24, 25
Cutters, Deburring, 193
Cutters, Engraving, 270
Cutters, Gear, 147
Cutters, Milling, 24, 25, 61, 147, 265
Cutters, Special, 193

Simple
tapered
working
can be ti
inal acc
jaw rock
mouthing
for less
gripping
piece har
inates dis
in your o

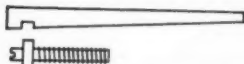
Another Buck "First" for You

Buck Gibbed Keyway

Ajust-Tru® Power Chuck with Aluminum Body



- ★ .001" Precision
- ★ Gibs Take Up Wear
- ★ 40% Weight Saving
- ★ All Working Surfaces
Hardened, Ground,
Lubricated
- ★ All Ajust-Tru Features
- ★ Available in
6½", 8¼", 10", 12"



Simple, sound, practical! Two tapered gibs under each jaw, working on tapered keyways, can be tightened to preserve original accuracy and eliminate the jaw rocking that develops "bell-mouthing." Jaws are 40% lighter for less centrifugal effect, better gripping at high speeds. One piece hardened front plate eliminates distortion, can be reground in your own shop.

You'll agree when you see it and use it—Buck has made chuck history again with this new gibbed keyway power chuck with aluminum body.

Wear take-up features will *triple* its useful *precision* life, compared with conventional chucks. 40% weight saving increases efficiency and cuts machine wear.

Send for complete details. More than ever—"It pays to chuck with Buck."

BUCK TOOL COMPANY

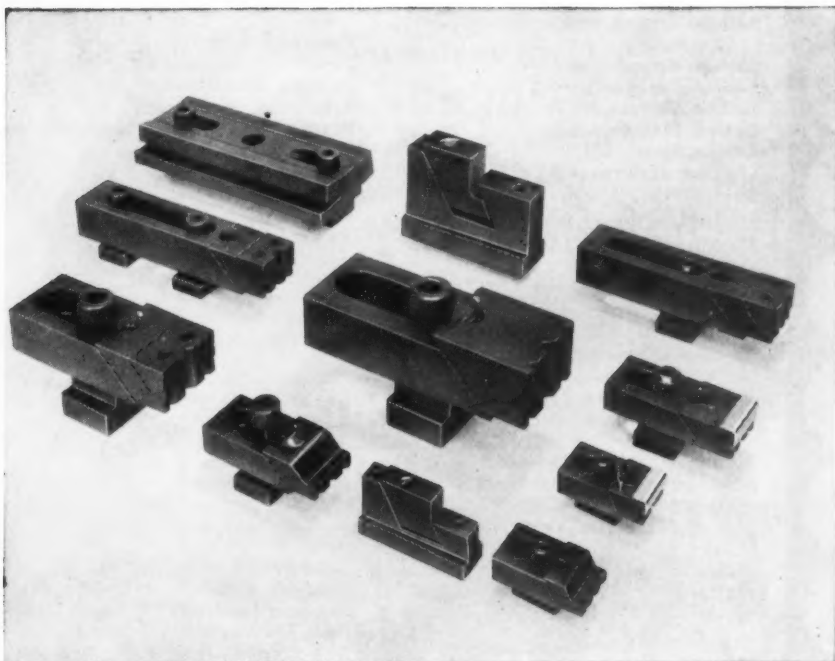
614 SCHIPPERS LANE • KALAMAZOO, MICH.

For more data circle 575 on Postpaid Card

June, 1958

modern machine shop 279

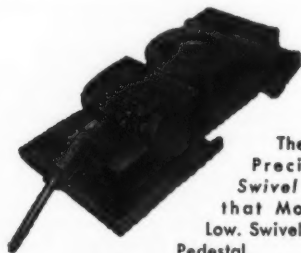
- Cylinders, Hydraulic and Pneumatic,** 49, 53, 191
- Deburring Machines,** 34
- Diamond Wheels,** 272
- Diamonds and Diamond Tools,** 272
- Die Heads,** 4
- Die Lifting and Handling Machines,** 262
- Die Making Machines,** 46, 47
- Dies, Punching or Forming,** 23, 68, 83, 84, 137, 172, 190
- Discs,** 230
- Dividing Heads,** 226, 251, 273
- Dressers, Grinding Wheel,** 272
- Dressing Fixtures, Grinding Wheel,** 33, 172, 213, 225, 277, 281
- Drill Heads,** 62, 200, 203, 205, 264
- Drill Jigs,** 240, 290
- Drill Pointers,** 46, 47
- Drill Rod,** 209
- Drill Sharpening Fixtures,** 16, 226
- Drilling Attachments,** 40, 205, 233, 252
- Drilling Machines, Multiple Spindle,** 38
- Drilling Machines, Radial,** 36, 37, 87, 92
- Drilling Machines, Upright,** 31, 36, 37, 270, 276
- Drilling Machines, Sensitive,** 36, 37, 38, 75
- Drilling Machines, Unit Type,** 180
- Drilling and Tapping Machines, Combination,** 38
- Drilling Units,** 56, 88
- Drills, Center, Core, Twist, etc.,** 6, 66, 68b, 68c, 83, 147, 159, 173, 234, 236, 242, 252, 253, 257
- Drills, Portable Electric,** 141, 247
- Drills, Portable Pneumatic,** 211
- Drills, Step,** 159
- Drivers, Work,** 203
- Duplicating Machines,** 29
- Dust Control Equipment,** 167, 216
- End Mills,** 68b, 68c, 83, 147, 153, 189, 190, 268
- Feed Units,** 40, 54, 56, 242
- Feeler Gage Stock,** 171
- Felt Parts,** 228
- Files,** 193, 246
- Filters,** 90, 145, 212
- Flame Hardening Apparatus,** 10, 11
- Flexible Shaft Equipment,** 79, 141
- Fluids, Cutting,** 10, 11
- Forming Machines,** 10, 11, 44, 190
- Furnaces, Heat Treating,** 157, 210, 231, 250
- Gage Blocks,** 200
- Gages,** 58, 59, 61, 68b, 68c, 77, 79, 82, 146, 182, 196, 199, 225, 241, 248, 249
- Greases,** 238
- Grinders, Abrasive Band and Belt,** 43, 187, 207
- Grinders, Air,** 163
- Grinders, Centerless,** 7
- Grinders, Cutter and Tool,** 10, 11, 29, 46, 47, 78
- Grinders, Cylindrical,** 50, 51, 60
- Grinders, Disc,** 68b, 68c
- Grinders, Drill,** 196, 222, 226
- Grinders, Face Mill,** 46, 47
- Grinders, Internal,** 7
- Grinders, Jig,** 23, 36, 37
- Grinders, Portable Electric,** 141
- Grinders, Portable Pneumatic,** 211
- Grinders, Surface,** 68a, 95, 132, 151, 239
- Grinders, Swing Frame,** 208
- Grinders, Tool Bit,** 46, 47
- Grinders, Valve Face,** 141
- Grinding Fixtures and Attachments, Inside Back Cover**
- Grinding Wheels,** 10, 11, 50, 51, 60, 67, 132
- Hand Tools, Power**
(Look for specific item)
- Handles, Hammer,** 172
- Handles, Machine,** 158
- Handwheels,** 158
- Hardness Testing Devices,** 162, 178, 198
- Hinges,** 163
- Hob Sharpening Machines,** 24, 25
- Hobbing Machines,** 24, 25
- Hobs,** 24, 25, 61, 83, 147
- Holders, Floating,** 274
- Holders, Reamer,** 238
- Holders, Tool,** 22, 32, 68b, 68c, 101, 153, 223
- Hones,** 233
- Honing Machines,** 8, 165, 233
- Hose Assemblies, Coolant,** 276
- Hydraulic Equipment**
(Look for specific item)
- Indicators,** 199
- Inserts, Carbide,** 32, 68b, 68c
- Inspection Devices,** 192
- Integrators, Electronic,** 231
- Jaws, Faceplate,** 49
- Jig and Fixture Components,** 240
- Jig Bore, 36, 37, 230**
- Keys, Machine,** 214
- Keys, Woodruff,** 214
- Knobs, Hand,** 158, 222
- Knurls,** 188



Where you can get . . .

DOWN-HOLDING DEVICES for any machine table or face plate

J & S All-Purpose Jaw Clamps eliminate U-Clamps, Straps and Fingers for lathes, planers, milling machines, boring millers, jig borers, etc.



The only
Precision
Swivel Vise
that Mounts
Low. Swivels. No
Pedestal.

Faster Set-up with any of the 5 Models of J & S Jaw Clamps—one adjusting screw has a holding force of $2\frac{1}{2}$ tons on the Small Model, to 12 tons on Jumbo Model for positioning and holding the work-piece.

Single powerful clamping action obtained from the 45° angle inward and downward movement of the jaw clamp is easily applied and controlled.

Compact, efficient design of J & S Jaw Clamps eliminates the usual obstruction problems—no interference with measuring tool readings.

See your industrial distributor or write today for free literature.



WHEEL DRILLERS • SAW CLAMPS • PRECISION VISES • DOWN-HOLDING DEVICES

J & S TOOL CO., INC.

CLAMPCUT ONE BAR

871 DORSA AVE.
LIVINGSTON, NEW JERSEY

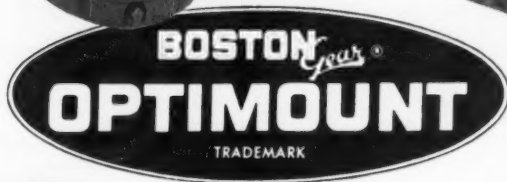
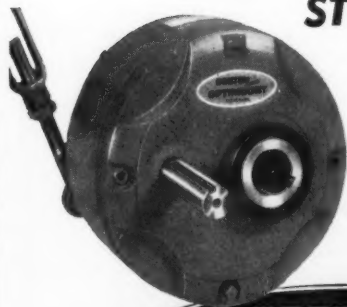
For more data circle 576 on Postpaid Card

- Lathes, Automatic, 27, 185
 Lathes, Engine and Toolroom, 14, 15, 41, 271, 275
 Lathes, Speed, 206
 Lathes, Tracer, 16
 Lathes, Turret, 236
 Layout Materials, 225
 Lifters, Sheet, 201
 Lighting Equipment, 221
 Lubricants, 238, 266
 Magnifiers, 194, 218
 Marking Devices, 170, 205, 216, 232, 250, 258, 263
 Metallizing Equipment, 86
 Micrometers, 199
 Microscopes, 272
 Milling Attachments, 40, 217, 273
 Milling Fixtures, 274
 Milling Machines, Bench, 265
 Milling Machines, Horizontal, 10, 11, 29, 221, 273
 Milling Machines, Thread, 61
 Milling Machines, Turret, 40
 Milling Machines, Universal, 271
 Milling Machines, Vertical, 29, 181, 273
 Mills, Midget, 193
 Motors, 283
 Mountings, Machine, 177
 Nibblers, 179, 192
 Notching Units, 55, 169
 Nut Drivers, 54
 Oil Groovers, 255
 Oiling Machines, Spindle, 255
 Oils, Cutting, Inside Front Cover
 Oils, Grinding, Inside Front Cover
 Oils, Soluble, Inside Front Cover
 Ovens, 174
 Pans, Tote, 265
 Pantographs, 29
 Parts, Machine Tool, Production, Aircraft, etc., 85, 88, 255
 Pins, Dowel, Taper, etc., 192, 209, 214
 Pins, Guide, 68
 Plates, Angle, 217
 Plates, Sine, 69, 253, 276
 Plates, Wear, 68, 237
 Polishers, Portable Electric, 141
 Polishers, Portable Pneumatic, 211
 Power Units, Hydraulic and Pneumatic, 53, 56
 Presses, Air, 31
 Presses, Arbor, 31, 164
 Presses, Bench, 90, 203, 208
 Presses, Foot, 31
 Presses, Hydraulic, 39, 164
 Presses, Mold Spotting, 264
 Presses, Power, 31, 35, 39, 186, 190, 197, 207
 Presses, Punch, 188, 219
 Presses, Stamping, 9
 Presses, Straightening, 183
 Projectors, Profile, 219
 Pumps, Coolant and Lubricant, 40, 287
 Pumps, Molten Metal, 287
 Punches, 84, 172, 214
 Punching Units, 55
 Pyrometers, 224
 Quills, 84, 201
 Racks, Machine, 214
 Reamers, 24, 25, 68b, 68c, 83, 147, 193, 241
 Reductors, 283
 Reels, 242
 Refractories, 50, 51, 60
 Regulators, 57, 90
 Rings, O, 143
 Riveting Machines, 208, 230
 Rolls, 44
 Rust Preventatives, 205
 Sanders, Portable Electric, 141
 Sanders, Portable Pneumatic, 211
 Sanding Machines, Belt and Disc, 224
 Saw Blades, Band, 71, 89, 97, 266
 Saw Blades, Circular, 81
 Saw Blades, Hack, 28, 71, 89
 Saw Blades, Power, 71, 89
 Saw Frames, Hack, 89
 Saw Sharpening Machines, 223, 259
 Sawing Machines, Band, 31, 263
 Sawing Machines, Hack, 28, 91, 214, 273
 Saws, Portable Electric, 141, 246
 Scrapers, Power and Hand, 254
 Screw Drivers, Portable Pneumatic, 141
 Screw Driving Machines, 54
 Screw Machines, Automatic, 18, 19, 29
 Screws, Cap, Set, Socket, and Machine, Back Cover
 Screws, Transfer, 168, 256
 Scribes, 82
 Segments, Grinding, 132
 Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 7, 23, 26, 131, 172, 189, 205, 210, 224, 226, 234, 236, 256, 270, 276
 Shapers, 12, 244
 Shears, Hand, 208
 Shears, Squaring, 31
 Shim Stock, 171

A New achievement in STANDARDIZATION

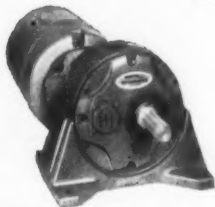
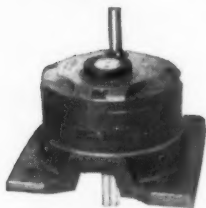
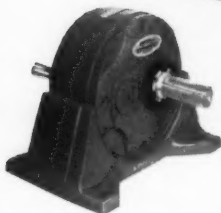
by industry's
most experienced
specialists in
speed reducer
design

**OPTIONAL
MOUNTING**



**OPTIMUM
PERFORMANCE**

**HELICAL GEARED
REDUCTORS
RATIOMOTORS
AND FLANGED REDUCTORS
SHAFT-MOUNTED
or BASE MOUNTED**



**SINGLE or DOUBLE
REDUCTION
1/6 to 15 HP
drives**

From Stock

**CALL
YOUR**

BOSTON
DISTRIBUTOR *Gear*



**Ask for NEW
OPTIMUM
Catalog
OP-1**

Boston Gear Works, 68 Hayward St., Quincy 71, Mass.

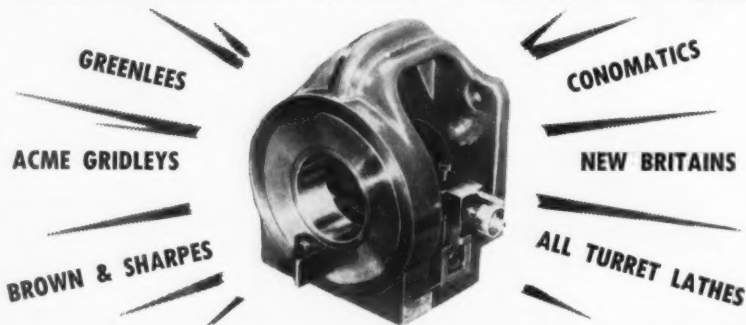
For more data circle 577 on Postpaid Card

Shims, 171, 202, 237, 265
 Sine Bar Fixtures, 69, 253, 276, 281
 Slotting Machines, 20, 21
 Spacing Collars, 171
 Special Machinery, 23, 43, 210, 228
 Speed Reducers, 235, 283
 Spindles: Grinding, Boring, Milling,
 etc., 17, 255, 256, 292
 Spray Equipment, 90, 248
 Springs, 158, 266
 Steel, Alloy, 26
 Steel Stock, Ground Flat, 209
 Steel, Tool, 26
 Stock Racks, 198
 Stops, Collet, 210
 Straightening Machines, 242

Tables, Elevating, 73, 176
 Tables, Milling and Grinding, 144, 187
 Tables, Rotary and Index, 5, 23, 210,
 217, 240, 244, 273
 Tables, Work, 260
 Tapes, Pressure Sensitive, 50, 51, 60
 Tappers, Automatic, 205, 218
 Tappers, Hand, 222
 Tapping Attachments, 205, 233, 267
 Tapping Heads, 62, 200, 203, 205, 218,
 257, 264
 Tapping Machines, 38, 75, 92
 Tapping Units, 56

Taps, 61, 68b, 68c, 76, 83, 146
 Thermostats, 231
 Tool Bits, 48, 68b, 68c, 258
 Tool Blanks, 68b, 68c
 Tools, Boring, 65, 259
 Tools, Carbide, 83, 147
 Tools, Carbide-Tipped, 68b, 68c
 Tools, Form, 188
 Tools, Lapping, 212
 Tools, Nut Running, 45
 Tools, Radius, 197
 Tools, Reciprocating, 272
 Tools, Screwdriving, 45
 Tools, Threading, 188, 255
 Tools, Turning, 194, 284
 Trimming Machines, 226
 Tube Mills, 44
 Turrets, Lathe, Tool Post, Bed and
 Tailstock, 215
 Valves, 53, 90, 242
 Vises, Bench and Machine, 30, 33, 40,
 90, 217, 246, 267, 273, 281
 Washing Machines, Industrial, 187
 Wipers, Industrial, 285
 Wrenches, 101
 Wrenches, Impact, 141
 Wrenches, Power, 49
 Wrenches, Torque, 204

TURN IRREGULAR SHAPES with the POLYGON TOOL BOX

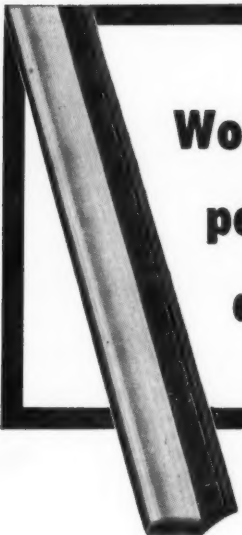


With this Tool Box you can turn hexagonal, octagonal and other irregular contours from round stock, drilled and finished in one operation. Produce mating internal and external shaped parts. 48 Hour Delivery on Cams.

Price and complete details on request.

BRADLEY MACHINERY CO. 4400 CONNER DETROIT 15, MICH.

For more data circle 578 on Postpaid Card



**Would you spend
pennies a year to protect
a \$40,000 machine tool?**

**C/R Way Wipers prevent
scoring and abrasion of machine tool ways!**

A 36-inch vertical milling machine, for instance, costs more than \$40,000. The cost of protecting ways with C/R Sirvene (synthetic rubber) Way Wipers can be measured in pennies per year. In addition, C/R Way Wipers pay for themselves many times over by eliminating downtime and reducing costly master-mechanic maintenance. Precision molded for accurate fit, they wipe ways clean of dirt, chips, fine abrasives, even water emulsions. They fit flat ways, side rails, angles, columns and hydraulic rams. C/R Way Wipers are available in four types for all applications.

*Write for this detailed, illustrated
brochure on C/R Sirvene Way Wipers.*



CHICAGO RAWHIDE MFG. CO.

1233 Elston Avenue, Chicago 22, Illinois

Offices in 55 principal cities. See your telephone book.
In Canada: Manufactured and distributed by Chicago
Rawhide Mfg. Co. of Canada, Ltd., Hamilton, Ontario
Export Sales: Geon International Corp., Great
Neck, New York

SIRVENE



DIVISION

**CHICAGO
RAWHIDE**

For more data circle 579 on Postpaid Card

index to advertisements

**For listing of products offered by
these advertisers please consult
the "Where To Get It" Section.**

A. K. Tool Co., Inc.	256	Bridgeport Machines, Inc.	40
Aber Engr. Wks., Inc.	265	Brightboy Industrial Div., Weldon Roberts Rubber Co.	67
Abrasive Machine Tool Co.	68a	Brown Corp., W. R.	90
Abrasive Products, Inc.	68d	Buck Tool Co.	279
Accurate Bushing Co.	88	Bunting Brass & Bronze Co.	85
Ace Drill	66	Butterfield Div., Union Twist Drill Co.	83
Acme Tool Corp.	272	Byco Industries	210
Agel Mfg. Co.	167	CTR Sales & Grinding Co.	189
Airetool Mfg. Co.	211	Card Div., S. W., Union Twist Drill Co.	146
Albertson & Co., Inc.	141	Carlton Machine Tool Co.	87
Alina Corp.	199	Carroll Dividing Head Co.	226
Allegheny Ludlum Steel Corp.	32	Cerro de Pasco Sales Corp.	236, 252
Allstate Diamond Products, Inc.	272	Chicago Mfg. & Dist. Co.	266
Alco Co.	265, 266	Chicago Rawhide Mfg. Co.	285
American Chain & Cable Co., Inc., Wilson Mechanical Instrument Div.	178, 179	Chicago Tool & Engr. Co.	217
American Drill Bushing Co., Inc.	First Cover	Cincinnati Gilbert Machine Tool Co.	240
American Roller Die Corp.	44	Cincinnati Lathe & Tool Co.	16
American Saw & Mfg. Co.	97	Cincinnati Milling Machine Co.	10, 11
American Sip Corp.	269	Clark Co., Robt. H.	239
Anderson Bros. Mfg. Co.	254	Clark Instrument, Inc.	198
Apex Machine & Tool Co.	45	Clemson Bros., Inc.	89
Armstrong-Blum Mfg. Co.	28	Cleveland Crane & Engr. Co.	42
Armstrong Bros. Tool Co.	101	Cleveland Punch & Shear Wks. Co.	35
Arrow Tool & Reamer Co.	268	Collis Co.	196
Austin Industrial Corp.	273	Commander Mfg. Co.	218
Auto Moulding & Mfg. Co.	163	Comtor Co.	241
Avey Div. of Motch & Merryweather Mchry. Co.	5	Continental Machine Co.	260
B & W Precision Products Co.	173	Continental Tool Wks., Div. of Ex-Cell-O Corp.	133
Bacon Felt Co.	228	Cook, Inc., L. H.	172
Bald Eagle Corp.	276	Cunningham Co., M. E.	258
Barber-Colman Co.	265	Cushman Chuck Co.	49
Barer Engr. & Mchry. Co., Ltd.	275	Desmond-Stephan Mfg. Co.	246
Barker Engr. Co.	265	Despatch Oven Co.	174
Barnes Co., Inc., W. O.	71	Detroit Power Screwdriver Co.	54
Barry Controls, Inc.	177	Detroit Stamping Co.	171
Bearings, Inc.	143	DeVlieg Microbore, Div. of DeVlieg Machine Co.	13
Besly-Welles Corp.	68b, 68c	Dixon Automatic Tool Co., Inc.	159
Black Diamond Saw & Machine Wks., Inc.	222	Dreis & Krump Mfg. Co.	190
Blanchard Machine Co.	132	duMont Corp.	48
Bokum Tool Co.	22	Duro Metal Products Co.	276
Boston Gear Wks.	283	Dykem Co.	225
Bradley Mchry. Co.	284		

Ruthman Gusher Coolant Pumps are Better

PRECISION BALANCE
with Heavy-Duty
ONE PIECE SHAFT

**CUTS
VIBRATION**

**PROLONGS
BEARING
LIFE**

**INSURES
LONGER...
TROUBLE-FREE
LIFE**

**ON
GUSHER
COOLANT PUMPS**

**REDUCES
WEAR**



THE INSIDE STORY

The shaft and rotating assembly of all Gusher Coolant Pumps is electronically balanced, precision built to reduce vibration to an absolute minimum. You get reduced wear, a longer... trouble-free life for your Gusher Pumps.

Gusher Coolant Pumps also give you split-second coolant flow from the moment the machine is turned on. There is no priming needed.

Maintenance effort is at a minimum too. Heavy-duty pre-lubricated ball bearings require no further attention. There is no packing needed—no seals requiring replacement. Specify Gusher Pumps on your machines. Write today for catalog and price list.

THE

Ruthman

MACHINERY CO.

- COOLANT PUMPS
- CIRCULATORS • AGITATORS
- MOLTEN METAL PUMPS

1816 READING ROAD

CINCINNATI, OHIO

For more data circle 580 on Postpaid Card

June, 1958

modern machine shop 287

Eastern Centerless Grinding Co.	189	Lubriplate Div.	
Economy Engr. Co.	176	Fiske Bros. Refining Co.	238
Edroy Products Co.	194	Lucas & Son, Inc., J. L.	265
Eisler Engr. Co., Inc.	205	M.B.I. Export & Import, Ltd.	267
Electro-Mechano Co.	270	Madison-Kipp Corp.	163
Enco Mfg. Co.	215	Marshall Steel Co.	209
Engelberg Huller Co.	43	Mathewson Machine Works	290
Ex-Cell-O Corp.	133	Maxwell Co.	259
Famco Machine Co.	31	Metallizing Engr. Co., Inc.	86
Federal Press Co.	186	Miller Fluid Power Div.	
Federal Products Corp.	248, 249	Flick-Reedy Corp.	175
Field & Son, Inc., W. W.	274	Mossberg, Inc.	6
Footo-Burt Co.	92	Moich & Merryweather Mchry Co.,	
Fosdick Machine Tool Co.	36, 37	Avey Div.	5
Fulmer Co., C. Allen	8	Mummerl-Dixon Co.	208
Gallmeyer & Livingston Co.	95	Mutual Machine Co., Inc.	245
Gisholt Machine Co.	27, 270	National Acme Co.	18, 19
Gorton Machine Co., Geo.	29	National Automatic Tool Co.	38
Grant Mfg. & Machine Co.	208	Nebel Machine Tool Corp.	12
Graymills Corp.	187	Neise, Karl A.	230, 245, 262
Greenerd Arbor Presses	164	Newcomer Products, Inc.	99
Greenlee Bros. & Co.	52	Nichols-Morris Corp.	251
Greenlee Tool Co.	247	Nielsen, Inc.	204
Greist Mfg. Co.	82	Nielsen Tool & Die Co.	256
Gwilliam Co.	163	Nirol Mfg. Co.	256
Hamilton Tool Co.	73, 75	Norgren Co., C. A.	57
Hammond Mchry. Builders, Inc.	187	Norton Co.	50, 51, 60, 64
Hanson-Whitney Co.	61	Numberall Stamp & Tool Co.	250
Harig Mfg. Co.	137	Nu-Tangs, Inc.	276
Hartford Special Mchry. Co.	56	Octagon Process, Inc.	205
Heald Machine Co.	7	Oliver Instrument Co.	46, 47
Heimann Mfg. Co.	168	O'Neil-Irwin Mfg. Co.	139
Heuser Mfg. Co.	240	Opto-Metric Tools, Inc.	272
Hi-Duty Drill Wks.	159	Osborn Mfg. Co.	291
Himoff Machine Co., Inc.	224	Pace Engr. Co.	262
Hoggson & Pettis Mfg. Co.	170	Peaslee Metal Products Co.	192
Hoglund Engr. & Mfg. Co.	277	Penniman, Elisha	234, 252
Holmes Gage & Development Corp.	252	Perfection Gear Co.	235
Holo-Krome Screw Corp.	Fourth Cover	Pines Engr. Co., Inc.	34
Houston Grinding & Mfg. Co., Inc.	159	Pope Mchry. Corp.	17
Ideal Industries, Inc.	229	Porter Machine Co.	172
Index Industrial Corp.	271	Pratt & Whitney Co., Inc.	76, 77, 78, 79
Industrial Filtration Co.	145	Prebco Bushing Co.	234
J & S Tool Co., Inc.	33, 281	Precise Products Corp.	201
Johnson Machine & Press Corp.	207	Preis Engraving Machine Co., H. P.	270
Johnson Mfg. Corp.	263	Procurier Safety Chuck Co.	257
Kalins & Co., J. M.	144	Pyrometer Instrument Co.	224
Keo Cutters	234	Racine Hydraulics & Mchry., Inc.	91
Kidde Precision Tool Corp.	210, 236	Reed Rolled Thread Die Co.	188
Lamina Dies & Tools, Inc.	68	Reich Mfg. Co., J. R.	212
Laminated Shim Co., Inc.	237	Reid Tool Supply Co.	158
Landis Machine Co.	4	Richards Co., J. A.	212
LeBlond Machine Tool Co., R. K.	14, 15	Ring Punch & Die Co.	84
Lehmann Boring Tool,		Robbins Co., Omer E.	69
Div. of Fulton Iron Wks. Co.	65	Rockford Machine Tool Co.	20, 21
Leland-Gifford Co.	289	Rodgers Hydraulic, Inc.	39
Linley Bros. Co.	230	Rowbottom Machine Co.	274
Littell Machine Co., F. J.	242	Royal Oak Tool & Machine Co.	Third Cover
Lodging, Inc.	63	Ruthman Mchry. Co.	287
Lodge & Shipley Co.	41	S-P Mfg. Corp.	191
Logansport Machine Co., Inc.	53	Sal Metal Products Co.	226
		Savage Co., W. J.	192

LARGE DIAMETER

ASA standard sizes up to 4 1/4" hole diameter. All renewable type bushings above the 7th diameter are provided with a double lock to insure more positive clamping and longer bushing life.

If you saw them at the ASTE Show, you know

BRINEY  **BUSHINGS**

**Offer You the Most Comprehensive Line of
LARGE DIAMETER, ASA STANDARD AND
INSTRUMENT DRILL JIG BUSHINGS**

BRINEY FREE LOCK BUSHINGS
SLIP RENEWABLE BUSHINGS
HEAD PRESS FIT BUSHINGS

BRINEY ECCENTRIC LOCK BUSHINGS
ROUND AND FLAT CLAMP BUSHINGS
HEADLESS PRESS FIT BUSHINGS

AND MATING LINERS

Also an excellent source for locating pins, dowel pins and precision hardened and ground parts.

*Contact any Leland-Gifford office
for catalog and price information*

SMALL DIAMETER

Down to #80. All Briney Standard bushings including the smallest diameters are *not counter-bored*. You get full bearing, full length for the drill or reamer. (Counterbored on request at no extra cost.)

Made By THE JIG BUSHING COMPANY, Pontiac, Michigan

Stocked and Distributed By

LELAND-GIFFORD

WORCESTER 1, MASSACHUSETTS, U. S. A.

DISTRICT OFFICES

CHICAGO 5
2515 W. Peterson Ave.

CLEVELAND 22
P. O. Box 853

DETROIT 31
10429 W. McMichals Rd.

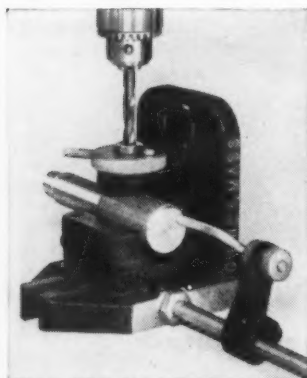
INDIANAPOLIS 6
P. O. Box 1051

LOS ANGELES
2620 Leonis Blvd.,
Vernon 58, Cal.

NEW YORK
75 S. Orange Ave.,
South Orange, N. J.

ROCHESTER 12
P. O. Box 24,
Charlotte Station

For more data circle 581 on Postpaid Card



NEW ADJUSTABLE DRILL JIG

**eliminates layout;
cuts drilling time**

Used for drilling holes through round stock and hex stock from $\frac{1}{4}$ " to 2" and cap screws from $\frac{1}{4}$ " to $1\frac{1}{4}$ ", the new Mathewson Adjustable Drill Jig eliminates layout and can cut drilling time on small lots to a fraction. And it eliminates the costs of special jigs for larger quantities. Holes for cotter pins, set screws, drive pins for bayonet joints, oil holes in tubular sections, and wiring holes in cap screws, are all typical of the operations that can be done more economically with this jig. Hole diameters range from .052" to .531", using your A.S.A. standard slip bushings. The hardened V-block has two 60-degree V's for centering round or hexagonal stock, one for $\frac{1}{4}$ " to $2\frac{1}{32}$ " diameter, one for $2\frac{1}{32}$ " to 2" diameter. Adjustable stop for locating work longitudinally for drilling any distance from end, may be used on either side. Adjustable bushing carriers hold slip bushings and clamp work securely. Jig highly successful in permitting use of inexperienced drill operators. For circular write to **Mathewson Machine Works**, 40 Hancock Street, Quincy, Massachusetts:

For more data circle 582 on Postpaid Card

Schauer Mfg. Corp.	206
Scherr Co., Inc., Geo.	219, 225
Schmidt, Inc., Geo. T.	232
Sentry Co.	157
Service Machine Co.	197
Severance Tool Industries, Inc.	193
Simonds Saw & Steel Co.	81
Skinner Chuck Co.	203
Smith-Mills Shaper Div., Nebel Machine Tool Corp.	12
Somerset Tool Co.	172
Sopko & Sons Co., Wm.	227
Spellman Co., R. L.	214
Sperman Metal Specialties	213
Standard Electrical Tool Co.	292
Standard Gage Co.	58, 59
Standard Steel Specialty Co.	214
Stevens, Inc., John B.	210
Sturtevant Co., P. A.	204
Sundstrand Machine Tool Co.	220
Sunnen Products Co.	233
Superior Hone Corp.	165
Taft-Peirce Mfg. Co.	243, 261
Texas Co.	Second Cover
Thermo Electric Mfg. Co.	231
Thomas Hoist Co.	244
Thompson Grinder Co.	151
Thriftmaster Products Corp.	205
Tool-Craft Co.	258
Tools, Inc.	222
Torit Mfg. Co.	216
Torsion Balance Co.	162
Troyke Mfg. Co.	244
Union Twist Drill Co.	147
U. S. Drill Head Co.	200
U. S. Steel Corp., U. S. Steel Supply Div.	26
Universal Metal Hose Co.	276
Up-to-Date Tool Co.	226
Verson Allsteel Press Co.	9
Victor Mchry. Exchange, Inc.	253
Viking Shear Co.	208
Vimco Mfg. Co.	221
Vogel Tool & Die Corp.	169
Vulcan Tool Co.	23
Wales-Strippit Co.	55
Walker Co., Inc., O. S.	195
Walls Sales Corp.	224
Wardwell Mfg. Co.	223
Watts Bros. Tool Wks.	236
Weldon Tool Co.	153
West Chemical Products Co.	155
Wharton Unitools	30
Wicaco Machine Corp.	255
Willey's Carbide Tool Co.	131
Wilson Air Collet Closer, Inc.	258
Wilson Mechanical Instrument Div., American Chain & Cable Co., Inc.	178, 179
Wisconsin Drill Head Co.	62
Zagar, Inc.	264
Ziegler Tool Co., W. M.	274

BRUSHING

June



BEFORE BRUSHING

Port plate for hydraulic pump has loose burrs and sharp edges. Cost to remove these by hand: 14¢

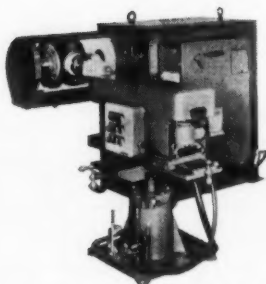


AFTER BRUSHING

All burrs are thoroughly removed and surface junctures blended to close uniformity. Cost with Brushamatic: 1.3¢



Quality when the pressure's on ... but costs 91% less when finished with OSBORN Brushamatic® Methods

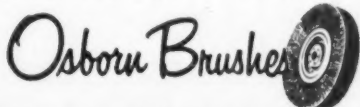


OSBORN BRUSHAMATIC® 3-A
operates on preset time cycles.

These port plates for hydraulic pumps are quality finished to precision tolerances to provide positive seal against high internal fluid pressures. For peak dependability in severe hydraulic service, surface junctures are uniformly blended in one simple, automatic operation with Osborn's Brushamatic Machine. At the same time, all burrs are thoroughly removed to eliminate subsequent fouling of hydraulic controls.

Production rate . . . both sides finished, 180 pieces per hour with Osborn Matic® Brushes.

Low cost, precision finishing like this may be applied to many types of products you now build. An Osborn Brushing Analysis, made in your plant at no obligation, can show you how to speed production . . . cut costs . . . improve product quality. Write us for details—and for your copy of the 20-page Brushamatic booklet. The Osborn Manufacturing Company, Dept. B-17, Cleveland 14, Ohio.



BRUSHING MACHINES • BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY
For more data circle 583 on Postpaid Card

STANDARD **SETS THE PACE in** **MILLING SPINDLES**

No.
6027 MY
Motor Driven

No.
6009 M
Motor Driven



No. 4207 M
Belt Driven

Meet America's BIG LINE!

From 1 to 200 HP with standard tapers, #10 to #60. To satisfy every milling demand — enclosed, totally enclosed fan-cooled, high cycle and liquid-cooled. Motorized or Belt-Driven. Variable, single or multiple speed motor — Speed to suit your application.

We're proud of our position of leadership in the field of spindles for milling applications — a leadership which is the result of nearly five decades of experience in the spindle field. For our customers, it means a milling spindle for every purpose — a complete line of master-crafted super-precision units with which the designer can meet the requirements of any milling job!

**FOR COMPLETE SPECIFICATIONS AND DIMENSION DRAWINGS
OF MORE THAN 75 MILLING SPINDLES, WRITE TODAY!**

SUPER PRECISION SPINDLE DIVISION
the STANDARD electrical tool co.
SPINDLES AND MACHINE TOOLS

SINCE 1912



HALLMARK OF
THROUGHOUT
METALWORKING
THE WORLD

2487 RIVER ROAD • CINCINNATI 4, • OHIO

For more data circle 584 on Postpaid Card

READER SERVICE CARD

JUNE, 1958

Your Name

Your Title

State

City

Company Name

Company Address

City

State

Products Manufactured

Number of Plant Employees

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

EDITORIAL ITEMS

ADVERTISEMENTS

1	26	51	76	101	126	151	176	201	226	251	276
2	27	52	77	102	127	152	177	202	227	252	277
3	28	53	78	103	128	153	178	203	228	253	278
4	29	54	79	104	129	154	179	204	229	254	279
5	30	55	80	105	130	155	180	205	230	255	280
6	31	56	81	106	131	156	181	206	231	256	281
7	32	57	82	107	132	157	182	207	232	257	282
8	33	58	83	108	133	158	183	208	233	258	283
9	34	59	84	109	134	159	184	209	234	259	284
10	35	60	85	110	135	160	185	210	235	260	285
11	36	61	86	111	136	161	186	211	236	261	286
12	37	62	87	112	137	162	187	212	237	262	287
13	38	63	88	113	138	163	188	213	238	263	288
14	39	64	89	114	139	164	189	214	239	264	289
15	40	65	90	115	140	165	190	215	240	265	290
16	41	66	91	116	141	166	191	216	241	266	291
17	42	67	92	117	142	167	192	217	242	267	292
18	43	68	93	118	143	168	193	218	243	268	293
19	44	69	94	119	144	169	194	219	244	269	294
20	45	70	95	120	145	170	195	220	245	270	295
21	46	71	96	121	146	171	196	221	246	271	296
22	47	72	97	122	147	172	197	222	247	272	297
23	48	73	98	123	148	173	198	223	248	273	298
24	49	74	99	124	149	174	199	224	249	274	299
25	50	75	100	125	150	175	200	225	250	275	300

301—Front Cover
302—Inside Front Cover
303—Inside Back Cover
304—Back Cover

410	435	460	485	510	535	560	585	610
411	436	461	486	511	536	561	586	611
412	437	462	487	512	537	562	587	612
413	438	463	488	513	538	563	588	613
414	439	464	489	514	539	564	589	614
415	440	465	490	515	540	565	590	615
416	441	466	491	516	541	566	591	616
417	442	467	492	517	542	567	592	617
418	443	468	493	518	543	568	593	618
419	444	469	494	519	544	569	594	619
420	445	470	495	520	545	570	595	620
421	446	471	496	521	546	571	596	621
422	447	472	497	522	547	572	597	622
423	448	473	498	523	548	573	598	623
424	449	474	499	524	549	574	599	624
425	450	475	500	525	550	575	600	625
426	451	476	501	526	551	576	601	626
427	452	477	502	527	552	577	602	627
428	453	478	503	528	553	578	603	628
429	454	479	504	529	554	579	604	629
430	455	480	505	530	555	580	605	630
431	456	481	506	531	556	581	606	631
432	457	482	507	532	557	582	607	632
433	458	483	508	533	558	583	608	633
434	459	484	509	534	559	584	609	634

431 Main Street, Cincinnati 2, Ohio

DO NOT WRITE IN THESE SPACES

modern
machine
shop

BUSINESS REPLY CARD

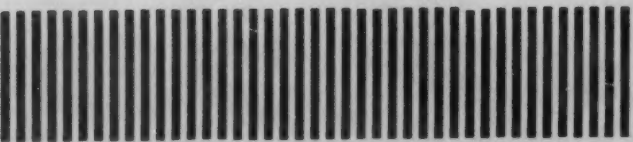
No Postage Stamp Necessary if Mailed in the United States

5 C POSTAGE WILL BE PAID BY—

**modern
machine
shop**

**431 MAIN ST.
CINCINNATI 2, OHIO**

**FIRST CLASS
PERMIT No. 1702
CINCINNATI, OHIO**



R-O RELIEF ALSO...

**makes gun drills
last longer,
cut better and
perform more consistently!**



Not only does the R-O permit exacting control and duplication in grinding gun drills but it grinds cam relief from edge to heel leaving maximum metal to support the edge and no feather edge to break down. Write for literature and instructions on how to grind gun drills.

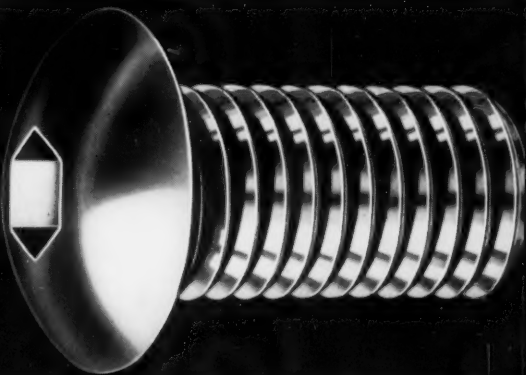
RO
UNIVERSAL
FORM RELIEVING
FIXTURE
R-O Grinder

GRINDER DIVISION
Royal Oak Tool & Machine Co.
29800 Stephenson Highway
Royal Oak, Michigan
Please forward your R-O catalog

Firm _____
Address _____
City-State _____
Per _____

For more data circle 303 on Postpaid Card

Problem: "Fasten thin metal parts where countersinking is impractical. Product is to have smooth, streamlined surface, so fastener head must be low and rounded. Fasteners must be removable . . . must stand up under repeated removal and re-tightening . . ."



Solution: HOLO-KROME BUTTON HEAD CAP SCREWS. Made of special analysis alloy steel heat-treated to 38-42 Rockwell "C" hardness. Sockets are scientifically proportioned for highest strength . . . especially important in shallow button head sockets. Internal Hex socket drive assures a smooth, unmarred head. New forging method results in improved fiber flow, tougher screws. Threads are Unified Class 3A fit.

For the finest in Hex Socket Screws . . . for unmatched Same-Day Service, the name to remember is Holo-Krome.

HOLO-KROME SOCKET SCREWS

THE HOLO-KROME SCREW CORPORATION • HARTFORD 10, CONN.



SOLD ONLY THROUGH AUTHORIZED HOLO-KROME DISTRIBUTORS

For more data circle 304 on Postpaid Card